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FIELD STUDY TO DETERMINE THE EFFECTS OF MARIJUANA AND ALCOHOL ON DRIVING PERFORMANCE

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The specific mention of any equipment, process or organization in this report should not be construed as an endorsement by Transport Canada or the Department of National Defence.

Responsibility for the results obtained and the conclusions reached herein rests with the authors not with the above agencies.

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ABSTRACT

A closed-course study is described which examined the effect on driving of marijuana alone and in combination with alcohol under typical conditions of social use. Three levels of marijuana (0, 100, 200 mcg/kg) were tested in combination with three levels of alcohol (0, .05%, .08% BAC); however, active marijuana was not combined with alcohol at .08% BAC. The study attempted to enhance ecological validity by administering the drugs to groups of subjects in a party-like atmosphere in the evening, driving at night as well as the morning after, and through the use of non-invasive toxicological techniques.

Sixty-two young male subjects who were moderate users of marijuana and alcohol were tested. Twenty-two measures of driving performance were recorded in an instrumented car as the drivers performed seven driving tasks. The driving tasks were representative of normal driving and presented conditions found to be associated with drug-involved collisions. Both marijuana and alcohol were found to have small effects on measures of driving performance at the dose levels tested.

EXECUTIVE SUMMARY

This report describes a field study to determine the effect on driving performance of marijuana alone and in combination with alcohol under typical conditions of social use. Driving tasks were selected on the basis that they represented both normal driving situations as well as driving situations which are known to lead to accidents The research was carried out in the evening when marijuana and alcohol are typically consumed. Young males who were moderate users of marijuana and alcohol, were considered the population at risk and were used as subjects. The marijuana and alcohol was consumed over several hours, in a home-like environment. Driving performance was examined on a closed course using an instrumented car. Subjects drove late in the evening as well as the following morning.

The basic design of the experiment was between-groups two-way factorial: 3 levels of marijuana treatment, 0, 100 and 200 mcg THC per kg bodyweight, and 3 levels of alcohol treatment, 0, 0.425, and 0.68 gm alcohol per kg bodyweight (for target blood alcohol concentrations of 0%, 0.05% and 0.08%). There were two missing cells: alcohol at the 0.08% level was not examined in combination with marijuana. Thus there were 7 treatment groups. It was intended to test 12 subjects per group. Due to instrumentation problems fewer were tested.

Subjects who were treated with placebo, the highest marijuana dose (200 mcg THC per kg bodyweight), the highest alcohol dose (0.68 gm alcohol per kg bodyweight) and the highest combined dose of alcohol and marijuana (200 mcg THC + 0.425 gm alcohol per kg bodyweight), participated in a morning-after session to test for 'hangover' effects on driving performance. To control for between group effects, these subjects also completed a baseline morning after run (after the previous nights baseline run).

For the training, baseline, treatment and morning-after runs, subjects completed a 45 minute drive in an instrumented car and performed the following tasks: velocity maintenance, lead car following, curve following, route sign following, emergency decision making, obstacle detection (treatment run only) and peripheral stimulus detection. Velocity, steering, lane position, lateral acceleration and headway measures were recorded. The driving tasks had been selected as being representative of normal driving, particularly those conditions under which drug-involved collisions occur.

Physiological measures collected during and after the treatment run included: blood alcohol concentration levels, pulse rates, and blood levels of THC and metabolites. A urine sample was taken prior to treatment to test for prior drug use.

Twenty-two variables (from seven tasks) were analysed for the evening run using 2-way analysis of covariance. For each variable, its baseline value was used as the covariate. For the morning after data, 1-way analyses of covariance were performed to compare the placebo, 0.08%, 0.05% - 200 mcg THC per kg B.W., and 200 mcg THC per kg B.W groups. Three variables (from the bridge and obstacle tasks) were

tabulated and examined for trends. For the velocity maintenance task, power spectra of steering wheel angle were calculated using the Fast Fourier Transform technique described by Bendat and Piersol (1971).

Alcohol at 0.05% BAC was associated with a signficant increase in speed on the open road curves (where speed was to some degree self selected) and a signficant decrease in peripheral detections. Paradoxically alcohol at the 0.08% BAC produced a signficant increase in peripheral detections. Unfortunately, the lane tracking data collected was unusable, so it was not possible to tell if the 0.08% BAC group chose to pay more attention to the peripheral task at the expense of the lane tracking task. Alcohol treatment was also associated with a signficant reduction in standard deviation of speed on the runway curves, which appeared to be related to increased acceleration and reduced braking.

Marijuana treatment produced a significant increase in standard deviation of headway in the lead car following task at the high dose level. This may have occurred because of an increase in headway, which makes it more difficult to detect changes in speed of the lead car.

Morning after comparisons showed only one variable to be significantly affected. For the 0.08% BAC group open road speed was significantly reduced compared to the other three groups that completed morning-after runs.

Both marijuana and alcohol were found to have small effects on measures of driving performance at the dose levels tested. The effects due to alcohol were generally larger than those due to marijuana. Even at BAC levels of .08%, alcohol was found to have relatively small effects though it is known that at this level, the risk of accident involvement rises sharply. Generally, marijuana and alcohol did not appear to interact.

The relatively small effects found in this study are attributed to the relatively high variability of data associated with on-the-road driving in contrast to that associated with the more controlled tasks used in laboratories and simulators. Although the design called for 12 subjects per cell, fewer numbers were achieved due to instrumentation problems. It would appear that the numbers obtained were too few in the face of high levels of variability to provide clearer results. In addition, clearer results would likely be obtainable if higher dose levels could be utilized.

INTRODUCTION

This report describes a field study to determine the effect on driving performance of marijuana alone and in combination with alcohol under typical conditions of social use. Driving tasks were selected on the basis that they represented both normal driving situations as well as driving situations which are known to lead to accidents. Sixty-two young males who were moderate users of marijuana and alcohol, considered the population at risk, were used as subjects. The study was carried out in the evening when marijuana and alcohol are typically consumed. The marijuana and alcohol was consumed over several hours, in a home-like environment. Driving performance was examined on a closed course using an instrumented car. Subjects drove late in the evening as well as the following morning.

BACKGROUND

Surveys have shown that large numbers of marijuana users exist in the Canadian driving population. A Gallup Poll (1981) suggested that 24% of the 1011 adult householders questioned nationwide had used marijuana or hashish. In the 18-29 age range about 50% had used the drug. Of the total sample, 7.6% reported using it at least once per week in the past 30 days. Epidemiological studies by Waller (1974), Smart (1974) and the Le Dain Commission (1972) indicate that the majority of marijuana users drive under the influence of the drug.

Previous research, using laboratory tests of skills required in driving, driving simulators and instrumented cars, has shown marijuana to impair driving performance. The slowed reaction time to random peripheral signals found in a laboratory study by Casswell and Marks (1973), and in driving simulator studies by Moskowitz et al (1972) and Smiley et al (1981), suggests that marijuana may impair the ability to monitor the environment for intersecting cars, pedestrians etc. Tracking skills have shown significant impairment at dose levels of 75 mcg THC/kg bodyweight and above in laboratory studies by Reid et al (1973) and Manno et al (1971), in a simulator study by Smiley et al (1981) and in an on-the-road study by Le Dain (1972). A number of studies using both simulators and cars suggested that risk-taking behavior is reduced after marijuana consumption. (Dott, 1972, Ellingstad et al, 1973, Casswell, 1977 and Smiley et al, 1981). Driving at slower speeds has been noted in several studies (Le Dain Commission, 1972; Smiley et al 1974; Casswell, 1977 and Allen et al, 1981). This was interpreted as evidence of a reduction in risk taking behavior. Finally, one study by Dott (1972) showed marijuana to be associated with an increase in decision time, but only in non-emergency situations. In emergency situations, decision time was unchanged.

Epidemiological evidence indicates that a more pressing problem than marijuana use, as far as traffic safety is concerned, is the combination of marijuana and alcohol. A study by the Traffic Injury Research Foundation of Canada (Warren, 1980) indicated that at least 3%

of the sample of 484 fatally injured drivers and pedestrians had used marijuana near the time of the collision (evidenced by detection of THC in blood sample). However, of these 16 victims, 14 (88%) had consumed alcohol as well. Similar findings were shown in a study of 267 drivers in Boston found responsible for a fatal vehicular accident (Sterling-Smith, 1976).

Unfortunately, data on types of collisions associated with marijuana use are scarce. The few studies that have been concerned with this issue have very small sample sizes (Teale et al, 1977; Cimbura et al, 1980.) Also, in most of the accident victims where marijuana was present alcohol was also. Bearing these caveats in mind, the findings from these studies were that collisions mainly involve male drivers in the 18-30 year range; occur at night; are mainly single vehicle, rollover or run-off-the-road types occurring on straight, dry roads under good driving conditions as a result of excessive speed. (Teale et al, 1977; Cimbura et al, 1980). Collision types known to be associated specifically with alcohol use are: speeding, running off the road, and going around curves. Using police reports, Marcus (1979) showed speeding was a factor in 37% of collisions for young drinking drivers compared with 14% of collisions where young drivers were not drinking. Goodfellow (1978) found that curved road accidents accounted for 31% of all young driver accidents where the driver was judged to have been impaired.

The purpose of the study described below is twofold:

1) To assess the effects on driving performance of marijuana alone and in combination with alcohol under normal conditions of social use, using driving tasks representative of normal driving conditions, particularly those conditions under which collisions occur when drivers are under the influence of marijuana, alone or combined with alcohol.

2) To determine if marijuana taken alone or in combination with alcohol affects driving performance the morning after consumption.

As discussed earlier, the effects of marijuana in combination with alcohol have been examined in previous research, in simulator studies by Allen et al (1981) and Smiley et al (1981) and in on-the-road studies by Casswell (1977) and Attwood et al (1980). However, in none of these studies were alcohol and marijuana administered under normal conditions of social use, ie. over an extended time period in the evening. Moreover, none of these studies involved driving at night, by far the most prevalent time for impaired driving accidents. The important question of 'morning-after' effects appears not to have been addressed at all in previous research. The study described below will provide information in each of these areas.

METHODS AND PROCEDURES

Experimental Design

(i) Evening Experiment

The basic design of the experiment was a between-groups 3 x 3 factorial: 3 levels of marijuana treatment, 0, 100 and 200 mcg THC per kg bodyweight, and 3 levels of alcohol treatment, 0, 0.425 and 0.68 gm alcohol per kg bodyweight (for target blood alcohol concentrations of 0%, 0.05% and 0.08% BAC).

Two of the nine treatment combinations were not examined: 0.68gm alcohol/kg B.W. in combination with the two active levels of marijuana. For safety reasons, the high alcohol, high marijuana combination was eliminated at the experimental design stage. The high alcohol low marijuana combination was not tested due to constraints on the study time frame. The high alcohol placebo marijuana treatment was included to facilitate interpretations of the effects due to other drug combinations. This high alcohol dose is equivalent to the statutory limit for driving in Canada. Thus there were 7 treatment groups. It was intended to test 12 subjects per group. Due to instrumentation problems fewer were tested. Actual subject numbers are shown in Table 1.

To control for between group differences all subjects performed a baseline run several days prior to the drug treatment run. The time of driving (10:00, 11:00, 12:00 PM, 1:00 AM), and the route to be taken in the navigation task (Routes A and B) were counterbalanced within each treatment group. Baseline runs and treatment runs for a particular subject took place at the same time of the day (plus or minus one hour). Drug-use data from screening questionnaires were used in an attempt to counterbalance tolerance level among the 7 treatment groups.

(ii) Morning-After Experiment

Subjects who were treated with placebo, the highest marijuana dose (200 mcg THC per kg bodyweight), the highest alcohol dose (0.68 gm alcohol per kg bodyweight) and the highest combined dose of alcohol and marijuana (200 mcg THC + 0.425 gm alcohol per kg bodyweight), participated in a morning-after session to test for 'hangover' effects on driving performance. To account for between group effects, these subjects also completed a second baseline run (the morning after the nights baseline run). Table 1 shows number of subjects tested.

Drug Treatments

At the evening treatment session subjects were administered beverages, alcoholic or non-alcoholic, and smoked cigarettes containing detoxified or active marijuana. The consumption of the alcohol and marijuana took place over a three hour period to simulate conditions under which these drugs are normally used.

TABLE 1

EXPERIMENTAL DESIGN

Treatment Night and Morning After

MARIJUANA mcg THC/Kg BW	0	100	200	TOTAL
ALCOHOL % Blood alcohol concentration				
0	9 M 7 *	8	8 M 6	25
0.05	10	8	9 M 6	27
0.08	10 M 7			10
TOTAL	29	16	17	62

* Number of subjects available for morning after runs.

The alcohol was administered in the form of beverages consisting of vodka and orange juice in the ratio 1:1.67. The placebo consisted of orange juice with a teaspoon of vodka floated on top. Subjects first received a loading dose over a one hour period followed by maintenance doses over a 2 hour period. The loading dose was divided into 3 drinks, each to be consumed over a 20 minute period. Maintenance doses consisted of single drinks consumed within a 10 minute period at 30 minute intervals. The loading and maintenance doses were calculated, using the subjects weight and body fat measurements, to achieve nominal instantaneous blood alcohol concentrations of 0, 0.064 or 0.1025% and steady state levels after 2 hours of drinking of 0, 0.05 or 0.08%. (See Appendix A for calculation methods.)

The marijuana was administered by having subjects smoke cigarettes composed of marijuana containing 2.2% delta-9 THC and/or detoxified marijuana. Three dose levels were used: 0, 100 and 200 mcg delta-9 THC per kg bodyweight. Each dose was administered in four equal cigarettes. Cigarettes were smoked, at half hour intervals, according to the following schedule: inhale (2 seconds) wash into lungs (2 seconds), hold (4 seconds), exhale (2 seconds) and rest (50 seconds). The administration was coached by a research assistant.

Subjects

Individuals who volunteered for the experiment were given a telephone interview to ensure they met the following criteria:

a) male
b) 21 - 30 years of age
c) moderate to light-heavy users of alcohol as defined by the Cahalan, Cisin and Crossley (1969) quantity-frequency scale of alcohol use
d) marijuana use at least once every 2 weeks and at most daily
e) 3 years driving experience
f) currently driving a car at least 5,000 miles per year and holding a verifiable driver's license

Candidates who successfully completed the telephone interview were administered the Minnesota Multiphasic Personality Inventory (MMPI) to screen out possibly emotionally unstable persons. A medical examination was also given to eliminate individuals not in good physical health. Subject interview instruments and the consent form are shown in Appendix B. Demographic data for each group of subjects is shown in Appendix C.

Subjects were asked to abstain from taking 'leisure' drugs for a period of one week prior to the first session and in the interval between sessions. All other drugs that were consumed were to be reported. A urine sample was taken at the start of each session to verify that subjects had indeed abstained from taking drugs. A bonus was paid at the completion of the study if the drug screen was negative. For payment schedules, the reader is referred to the consent form.

Driving Course and Apparatus

The roads, taxiways and runways of CF Base in Downsview, Ontario were used to make up a driving course. Figure 1 shows the base layout. The taxiway was marked with a 2.74 m wide lane for its entire length (approximately 2 km) to represent a traffic lane similar to that of a 80 kmh highway. All testing was carried out using the RSU instrumented vehicle, a 1980 Citation equipped with power steering and power brakes, V-6 engine and automatic transmission. The vehicle was fitted with a computer-based data acquisition system (Eatock et al, 1978) that permited the recording of velocity, acceleration, brake pressure, lane position, headway and steering wheel angle at a rate of 10 samples per second. Modifications to the instrumented car also permitted recording of turn signal activation as well as the activation of the two foot pedals used in the peripheral detection task.

A car with an identical wheelbase to the instrumented car was used as the lead car in the car following task. The car was fitted with a control box, mounted on the dashboard, to allow the driver to produce a consistent speed profile. The control box consisted of an electronic timing circuit, random order memory device and three small lights, green, yellow and red, representing 'maintain speed', 'decelerate' and 'accelerate' respectively. Six different profiles (patterns of light duration and sequencing) were stored in the memory of the device. The lead car accelerator was equipped with a metal clamp so that a constant rate of acceleration could be achieved for all test trials. The speed profiles were designed so that the lead car covered the same distance during each test.

Two sets of sixteen route signs, each showing 6 city names (of 5 characters) with arrows indicating direction were erected at intersections on the John Drury Crescent section of the course (see Figure 1). One set was used for nighttime runs and one set for daytime runs. For each time period (day or night) there were two destinations, one for each of the subject's test runs. In addition there was an extra set of six signs with a fifth destination which was used for training purposes. Signs showing speed limits and the presence of curves were erected on the runway and taxiway to make the driving course more realistic.

A bridge structure based on a design by Bathurst (1980) was used to create an emergency situation where the driver's path was blocked, forcing him to vear to the left, to the right or come to a complete stop. The bridge structure was 7.3 m (24 ft) in width and had thirteen tubes suspended at 0.5 m intervals (1 1/2 ft). Tubes were held parallel to the ground by means of mechanical latches. A control device was used to selectively activate the tubes causing them to drop to the vertical position. This device was triggered when the car drove over a rubber hose lying across the runway. There were three settings: 1) all tubes dropped, 2) four tubes blocking the driver's path, and creating a large gap to the right and a small gap to the left, 3) four tubes dropped to block the driver's path creating a large gap to the left and a smaller gap to the right.

BASE LAYOUT AND TASK LOCATION

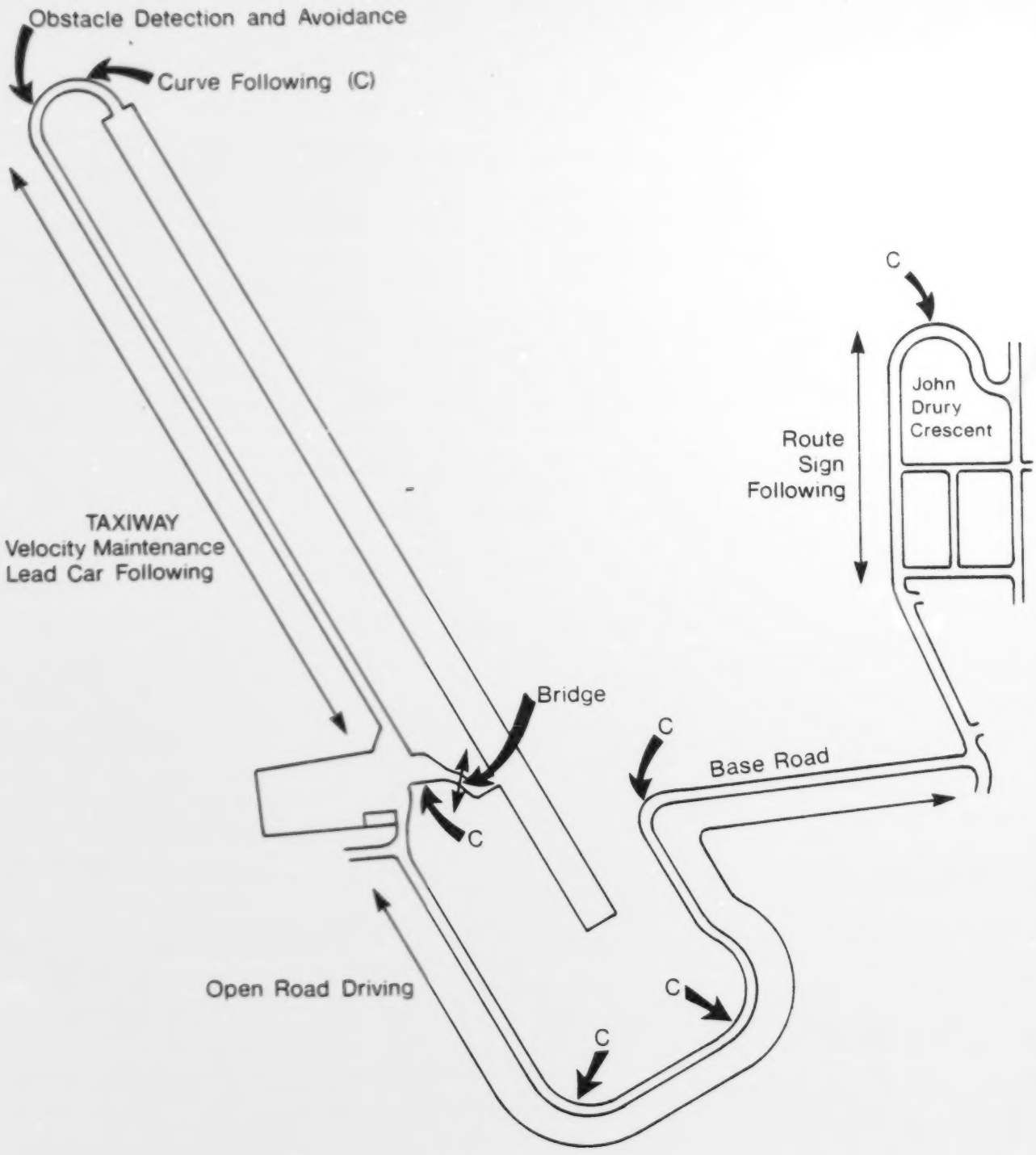


FIGURE 1

Driving Tasks and Measures

Subjects completed a 45 minute drive during which they performed eight different driving tasks. Driving tasks were selected to be representative of normal driving, and of situations in which accidents tend to occur. In addition, some tasks were included because they had been shown to be sensitive to drug effects.

Four tasks, velocity maintenance, curve following, open road driving and car following, measured the perceptual-motor skills involved in vehicle control. A fifth task, route sign following, was a search and recognition task which measured information processing skills. The sixth task, emergency decision making, measured the subject's ability to make quick judgements and perform an evasive action (perceptual-motor skill). The seventh task, obstacle detection and avoidance, measured the subject's ability to avoid a surprise obstacle. The eighth task, peripheral detection, measured the subject's attention to events in the peripheral field and his ability to select the appropriate response.

The tasks are described below together with the measures obtained for each task. Figure 1 shows the driving course and is annotated to indicate where each driving task took place.

1. Velocity Maintenance (7 repetitions): Subjects were asked to maintain a speed of 80 kph for approximately 1.6 km while driving in a marked lane on a taxiway.

   Performance measures were: mean and standard deviation of lane position and velocity, total area in the power spectrum of steering wheel angle, percent high frequency area in the power spectrum and peak frequency (measured by percent of 0 to 0.2HZ power between 0 and 0.4HZ).

2. Curve Following: (30 curves, 7 different radii: 11 replications of 1 curve, 10 replications of 1 curve, 2 replications of each of 4 curves, 1 replication of 1 curve.) Subjects were asked to keep to the posted speed limit while following curves.

   Performance measures were: maximum lateral acceleration, maximum brake pressure, mean velocity, mean and standard deviation of lane position, number of centre line crossings, time over the centre line.

3. Open Road Driving: (4 km total) Subjects were asked to drive on the base road from RSU to John Drury Crescent and then return. This route covers a section with fields on either side as well as a section with buildings on either side and a number of intersecting roads. Other traffic was minimal.

   Performance measures were: mean and standard deviation of lane position, mean velocity. (Presence of other traffic affecting the subject's driving behavior was noted.)

4. Car Following: (4 replications) Subjects were asked to maintain a

constant and safe distance behind a lead car which was speeding up and slowing down according to a preselected velocity profile, over approximately a one minute period.

Performance measures were: mean end standard deviation of lane position, mean and standard deviation of headway.

5. Route Sign Following: (16 signs, 8 turnoffs, 4 destinations) Subjects were asked to follow a given route to a given destination through the John Drury Crescent area. As soon as they saw their destination on a sign they signaled appropriately. If they missed a turn, the experimenter asked them to go back and take the turn but noted the missed turn.

   Performance measures were: number of correct turns, number of incorrect turns, distance from the sign at which the correct turn was signaled, total time to complete route.

6. Emergency Decision Making: (6 replications) The subject's path was blocked and he was forced to move to the right or the left depending on which side there was sufficient gap for the car to pass through. In one third of the trials, all of the tubes were dropped forcing the driver to come to a full stop to avoid hitting them. In one third of the trials a gap was created to the right, in the other third, to the left.

   Performance measures were: number of tubes hit, correct/incorrect gap selected, distance to spare between stopped car and tubes.

7. Obstacle Detection and Avoidance: (1 replication) On treatment run nights only, at the end of the run, the subject encountered a dummy dressed in dark clothing lying across the lane. To maintain the surprise element the subject only performed this task once.

   Performance measures were: hit/miss, swerve/stop.

8. Peripheral Detection: (48 replications) Subjects were asked to respond to the appearance of an illuminated stimulus which appeared as a silohuette of a car pointing either across the subject's path or away from it. Two display devices were mounted, one on each side of the car, in such a manner that the stimulus appeared at an angular displacement of 30 degrees from the forward visual axis and at eye level. Each device was capable of displaying two silohuettes of a car, one pointing away from the subject's car and the other pointing towards it. The subject's response was made using two foot switches, depending on which direction the displayed car was pointing. Subjects were instructed to depress the left switch if the displayed car was pointed towards his car (ie. across the car hood) and to depress the right switch if the displayed car was pointing away from his car (ie. away from the car hood).

   Performance measures were: number of correct responses, number of incorrect responses, mean and standard deviation of reaction time.

Training and Testing Procedures

Schedules for the baseline and treatment nights are shown in Figures 2 and 3.

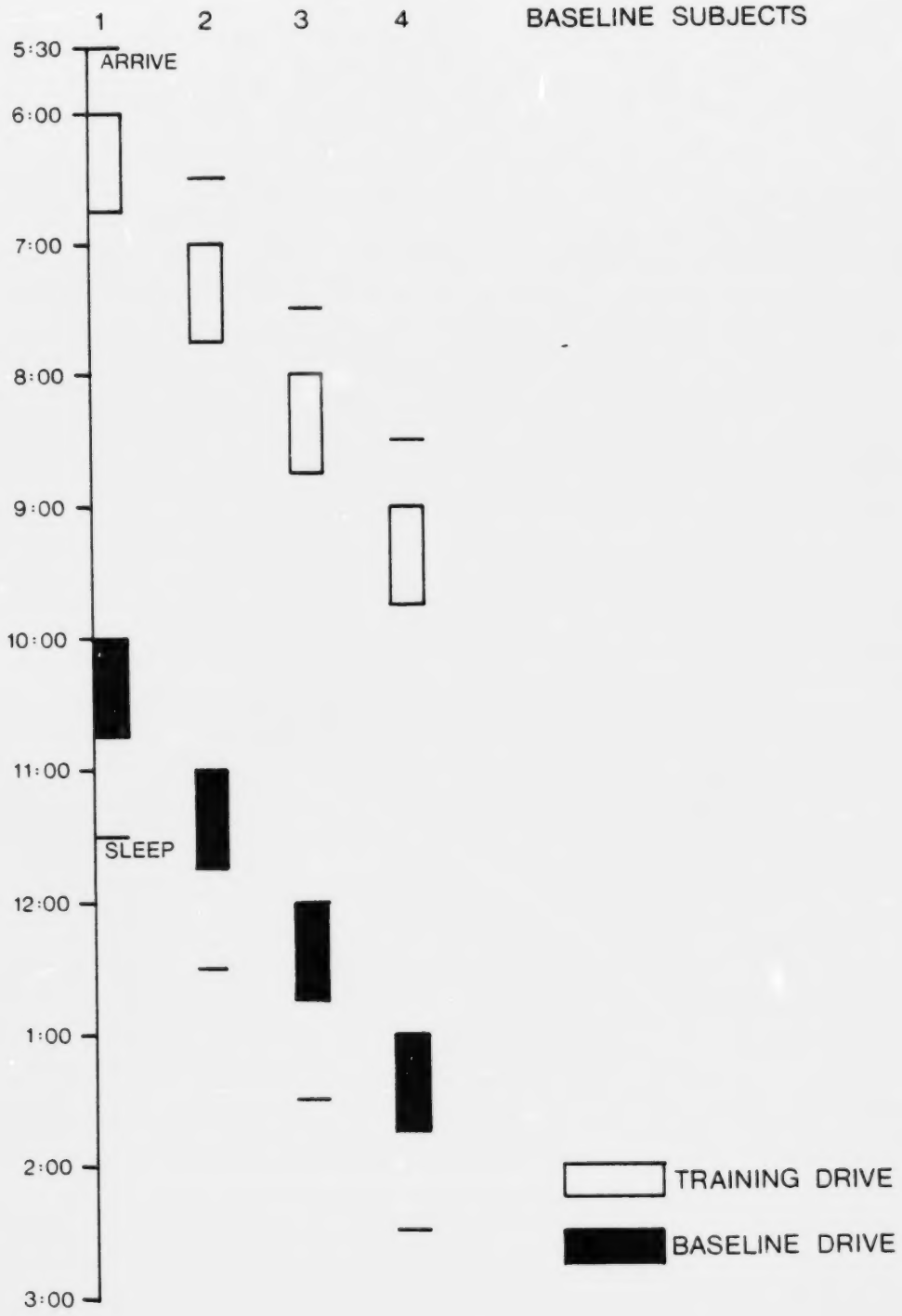
(i) Baseline Session

Two days of the week were reserved for baseline sessions. On these occasions four subjects came to the laboratory arriving at one per hour starting at 5:30 p.m. Prior to arrival at the laboratory, the subject had fasted for 2 hours. Upon arrival, the nurse asked the subject for a urine sample to be used as a drug screen. The nurse also took a BAC measurement to ensure an initial 0% BAC.

One half hour after arrival subjects were given a forty-five minute training run during which they were instructed on how to perform each task by an experimenter sitting in the front seat who read a standard set of instructions. Another experimenter sat in the back seat to run the on-board computer which recorded the driving performance measures and which controlled presentation of the peripheral detection task. The driving tasks used for the training session were performed in the order shown in Table 2. Task order was the same for the baseline and treatment runs. Each task was repeated a number of times and subjects required little instruction by the end of the training run. Only one training run was given since a pilot study (MacGregor et al, 1983) indicated essentially no learning over six forty-five minute runs using these driving tasks.

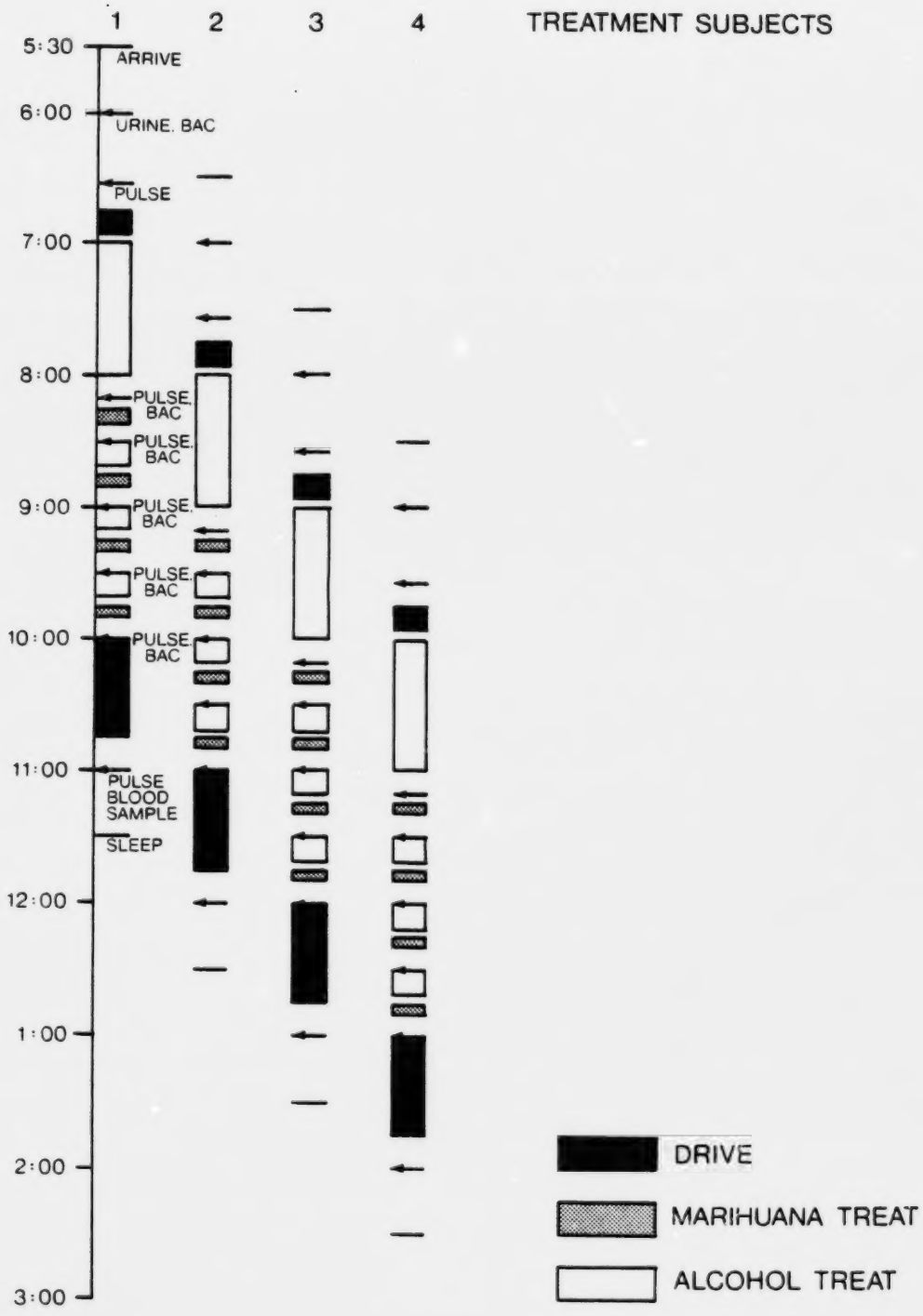
After the training run, subjects spent three hours in a lounge where they were encouraged to interact with other subjects and staff. Music and games helped create a 'party' atmosphere. This length of time was required to simulate the treatment night during which subjects spent the same amount of time receiving drug and alcohol treatments. At 10:00 PM the first subject drove his forty-five minute baseline run. Subsequent runs for the other three subjects took place at 11:00 PM, 12:00 PM and 1:00 AM. After the baseline run the subject was given a meal and then taken to nearby sleeping accomodation where he spent the night.

The next morning he received decaffeinated coffee and a snack and then completed a morning-after, baseline drive. Those subjects who were assigned to the placebo, 0.08% BAC, 200 mcg THC/kg bodyweight and combination 0.05% BAC and 200 mcg THC/kg bodyweight groups, completed a full forty-five minute morning-after baseline run. The other subjects completed a shortened version to give them essentially the same familiarity with the run but to allow the morning runs to be completed in as short a time as possible. Morning after runs followed the same order as nighttime runs and commenced at 8:00 AM. Sessions were scheduled so that no more than 2 out of the 4 subjects attending the evening session were required to perform full morning after runs.



BASELINE NIGHT SCHEDULE

FIGURE 2



TREATMENT NIGHT SCHEDULE

FIGURE 3

TABLE 2: TASK ORDER

1. Velocity Maintenance
2. Curve Following (2x)
3. Velocity Maintenance
4. Bridge
5. Lead Car Following
6. Curve Following (2 x)
7. Lead Car Following
8. Bridge
9. Open Road Driving (includes 4 Curve Following sections)
10. Route Sign Following (includes 1 Curve Following section)
11. Open Road Driving (includes 4 Curve Following sections)
12. Bridge
13. Velocity Maintenance
14. Curve Following (2 x) (Obstacle on Treatment Night Run)
15. Velocity Maintenance
16. Bridge
17. Lead Car Following
18. Curve Following (2 x)
19. Lead Car Following
20. Bridge
21. Velocity Maintenance
22. Curve Following (2 x)
23. Velocity Maintenance
24. Bridge
25. Velocity Maintenance
26. Curve Following

(ii) Treatment Sessions

Two days of the week were reserved for treatment sessions. The procedure was similar to the baseline session. Four subjects came to the laboratory arriving at one per hour starting at 6:00 PM. Each subject provided a urine sample and was given a breathalyzer test upon arrival. Shortly after arrival and before receiving any marijuana or alcohol, the subject completed an eight-minute warm-up run in the instrumented car.

After the warm-up drive, the subject was administered his alcohol and marijuana treatments over the next three hours. To ensure a double-blind experiment, the treatments were prepared by one research assistant and administered by another. The treatment was administered in the same lounge used on the baseline nights with the same attempt being made to create a 'party' atmosphere. This tended to be much more successful on treatment nights!

During the first hour of the treatment the subject received the loading dose for the alcohol treatment in the form of 3 drinks. Each drink was consumed over a 20 minute period. Ten minutes after the end of drinking, at t=70 minutes, the subject's BAC and pulse rate were measured and recorded.

Seventy-five minutes into the treatment the subject received his first marijuana cigarette. The research assistant coached administration of the marijuana cigarette according to the following schedule: inhale for 2 seconds, wash into lungs for 2 seconds, hold for 4 seconds, exhale for 2 seconds, relax for 50 seconds. This cycle was repeated until the subject finished the cigarette.

The cigarette was smoked in fifteen minutes or less. At fifteen minutes after the start of smoking the subject's BAC and pulse rate were recorded and he received his first maintenance drink which he had to consume within 10 minutes.

This sequence of events eg. smoking, taking BAC and pulse, and drinking was repeated three more times, once every half hour after the initial marijuana cigarette (with the exception that after the last cigarette no maintenance drink was given). At the end of the three hour treatment the subject was taken to the instrumented car for the forty-five minute driving test. Subjects were given the option of refusing to drive at this point and only one subject, who was in the 200 mcg/kg THC and 0.05% BAC treatment group, did so.

At the end of the drive the subject was returned to the laboratory. The nurse collected a blood sample from him, to be used for toxicological analysis, and recorded his BAC. The subject was then given a meal and taken to his sleeping accomodation.

The next morning the subject received decaffeinated coffee and a snack. Subjects in the four designated treatment groups then completed a forty-five minute drive. All subjects were driven home. Sessions were scheduled so that no more than 2 out of the 4 subjects tested in the evening were required for the morning-after runs.

DATA HANDLING AND ANALYSIS

Each driver's treatment run was recorded on floppy discs on the on-board LSI-11 computer. These discs were transferred and analyzed using a PDP-11 computer the same night as they were collected or shortly thereafter. This gave the experimenters up-to-date information on the functioning of the instrumentation. The analysis program printed out a summary of the statistics for all the measures for all driving tasks, and created a summary file on disc. The raw data on the floppy discs were then copied to magnetic tape for storage.

The experimenter operating the computer in the instrumented car made keyboard inputs to indicate the beginning and end of each driving task. Some of these inputs were not recorded because of problems with the keyboard and with the data recording system. Occasionally the experimenter made errors in inputing data. Many of these errors were subsequently corrected with an editing program before the data were analyzed. Where errors could not be corrected, data from the task affected could not be analyzed resulting in some data loss. Table 1 shows the number of subjects with essentially complete data records.

In addition to difficulties with data recording and reduction there were problems with the lane tracker, headway sensing device, steering potentiometer, and the velocity sensor. These last two resulted in loss of some task replications and a few cases where all data for a particular task were missing for a few subjects. The lane tracker did not function well in the cold weather. Problems were intermittent and not noticeable until a sizeable number of runs had been collected. Stripcharting of all the data disclosed that insufficient reliable lane tracker data were available for inclusion in the analysis. Consequently, mean and standard deviation of lane position and lane crossings could not be analyzed.

The remaining data were analyzed on an IBM-370 using the SAS statistical package. Minima and maxima were checked for each variable and values more than three standard deviations from the mean were dropped from the analysis. Twenty-two variables (from seven tasks) were analysed using analysis of covariance. For each measure the value of the variable on the baseline run was used as the covariate.

For the evening run the data were analyzed using a 2-way analysis of covariance. Three variables (from the bridge and obstacle tasks) were tabulated and examined for trends. For the morning-after run the data were analyzed using a one-way analysis of covariance.

For the velocity maintenance task, power spectra of steering wheel angle were calculated using the Fast Fourier Transform technique described by Bendat and Piersol (1971). The power spectrum enables one to look at amplitude of steering movement at each frequency - thus slower movements are distinguished from quicker movements and large movements from small movements. Slower movements are associated with control of lateral position and heading angle cues while faster movements are related to control of heading rate, and tend to occur when more effort is being made to control lane position (Mclean and Hoff-

man, 1975). After calculation of the power spectra three variables were calculated and analyzed using analysis of covariance: total power in the spectra, percent of the power above 0.4 HZ (related to heading rate control) and percent of the ratio of power between 0 and 0.2 HZ with power between 0 and 0.4 HZ. This last variable indicates whether a shift in the frequency peak has occurred when the resolution of the spectra is low (here 0.02 HZ).

RESULTS

Physiological Measures

The obtained blood alcohol levels both before and after driving are shown in Table 3. As can be seen, the average BAC values during the drive were very close to the 0.05% and 0.08% desired.

Blood samples taken immediately after driving were analyzed for delta 9 THC levels and for the levels of two active metabolites. Analysis was carried out using a gas chromatographic - mass spectrometric technique by the Civil Aviation Medical Unit, Health and Welfare Canada (Zamecnik and Armstrong, 1984).

The blood sample was taken at the end of the drive to avoid invasive procedures which might compromise the 'party' atmosphere. Also taking the blood sample at this time, rather than immediately after dosing when the THC level peaks rapidly, is more typical of the situation that might occur after a traffic accident when a sample might be taken to determine drug involvement.

TABLE 3

OBTAINED PERCENT BLOOD ALCOHOL CONCENTRATION LEVELS

TARGET BAC LEVEL		MARIJUANA LEVEL mcg THC/kg B.W. 0		100		200	
		Mean	St.Dev.	Mean	St.Dev.	Mean	St. Dev.
0.05%	Before Driving	0.0596	0.0126	0.0565	0.0042	0.0589	0.0108
	After Driving	0.0460	0.0099	0.0441	0.0051	0.0488	0.0088
0.08%	Before Driving	0.0817	0.0089				
	After Driving	0.0750	0.0120				

The THC and carboxy metabolite were detectable in most cases where subjects had consumed active doses of marijuana. The THC level ranged from 1.1 ng to 7.0 ng/ml for the 100 mcg/kg B.W. dose and from 0.5 ng to 9.8 ng/ml for the 200 mcg/kg B.W. dose. The acid metabolite ranged from 12.8 ng to 48.2 ng/ml for the low dose and from 14.2 ng to 53.0 ng/ml for the high dose (see Figure 4). The presence of alcohol appeared to depress the levels of THC and acid metabolite attained, though not significantly so. The concentration of the 11-OH THC metabolite was in most of the cases less than THC and in the majority of cases less than the detection limit. Consequently this metabolite is not included in Figure 4.

Forty-five minutes after the end of smoking, mean THC levels for the groups receiving low and high marijuauna treatments combined with placebo alcohol were not distinguishable -- the same was true for the acid metabolite levels. However, when the marijuana levels were combined with 0.425 gm of alcohol/kg B.W., THC levels after the high marijuana dose were on average 60% higher. A t-test showed this to be a statistically significant difference. Acid metabolic levels after the high and low dose marijuana treatments were not distinguishable.

Urine screens were carried out prior to treatment using Syva Diagnostics EMIT test kits. Urine was analyzed for the presence of amphetamines, barbituates, benzodiazepines, cocaine metabolite and cannabinoids. Ten subjects were found to have urine screens which were positive for cannabinoids and were excluded from the tabulation of the plasma level data. Because the urine screen is sensitive to cannabinoid metabolites it is possible to have a positive urine screen several days after marijuana intake though no behavioral effect is present. Though the 10 subjects had positive urine screens their THC and metabolic levels appeared very much in the same range as other subjects who did not have positive urine screens. Therefore their data were included in the analysis of driver performance measures.

Pulse rates were recorded just after each marijuana joint was smoked and just prior to driving. As can be seen from Figure 5, the active marijuana treatments resulted in increased pulse rates. The larger the marijuana dose the greater the increase in pulse rate. Increases in pulse rate due to alcohol treatment were not consistent; the largest increases occurred after 0.05% BAC treatment, smaller ones occurred after placebo and 0.08% BAC treatments.

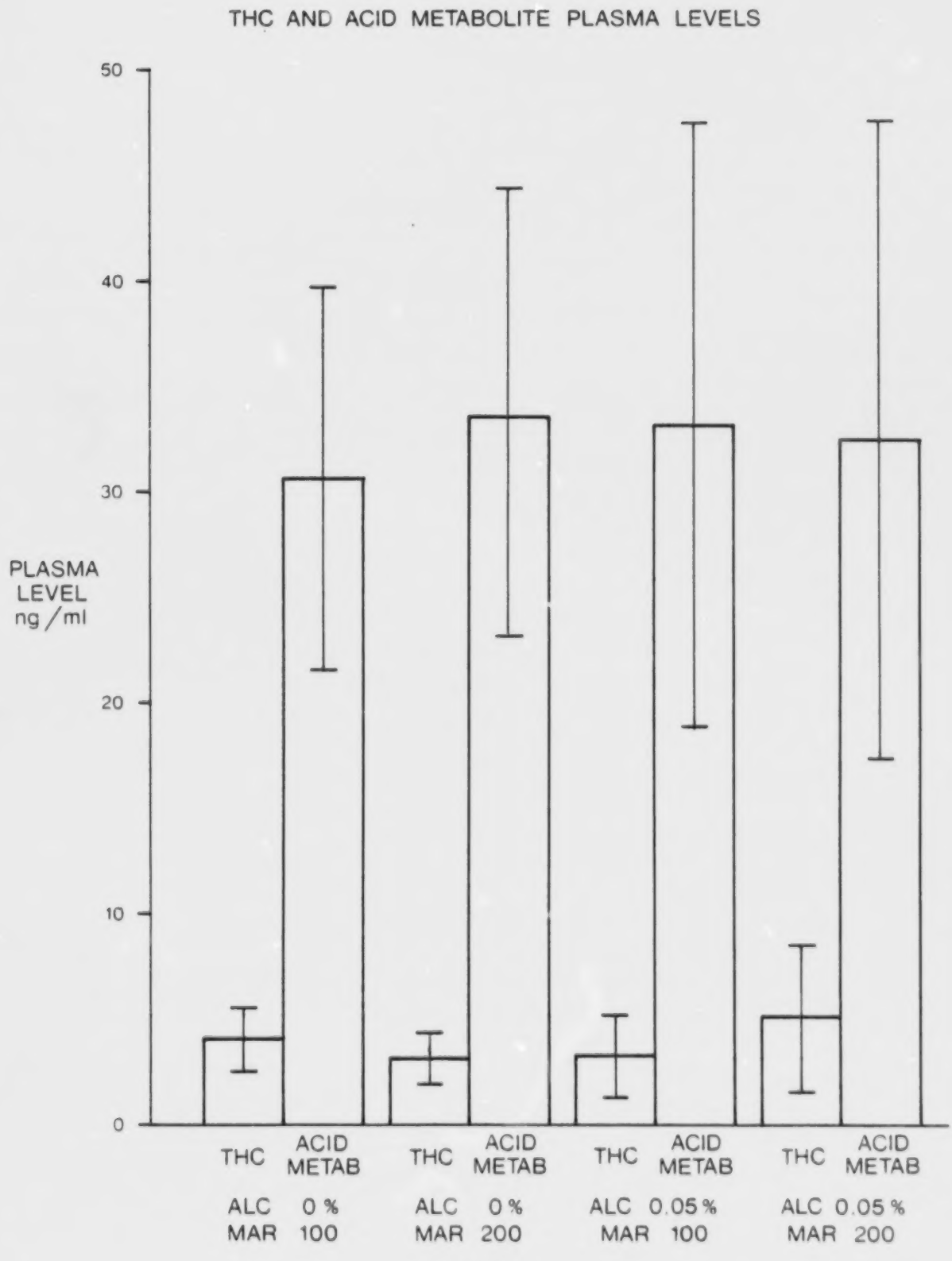

THC AND ACID METABOLITE PLASMA LEVELS
50
40
30
20
10
0
PLASMA LEVEL ng/ml
THC
ACID METAB
THC
ACID METAB
THC
ACID METAB
THC
ACID METAB
ALC 0 %
MAR 100
ALC 0 %
MAR 200
ALC 0.05 %
MAR 100
ALC 0.05 %
MAR 200

FIGURE 4

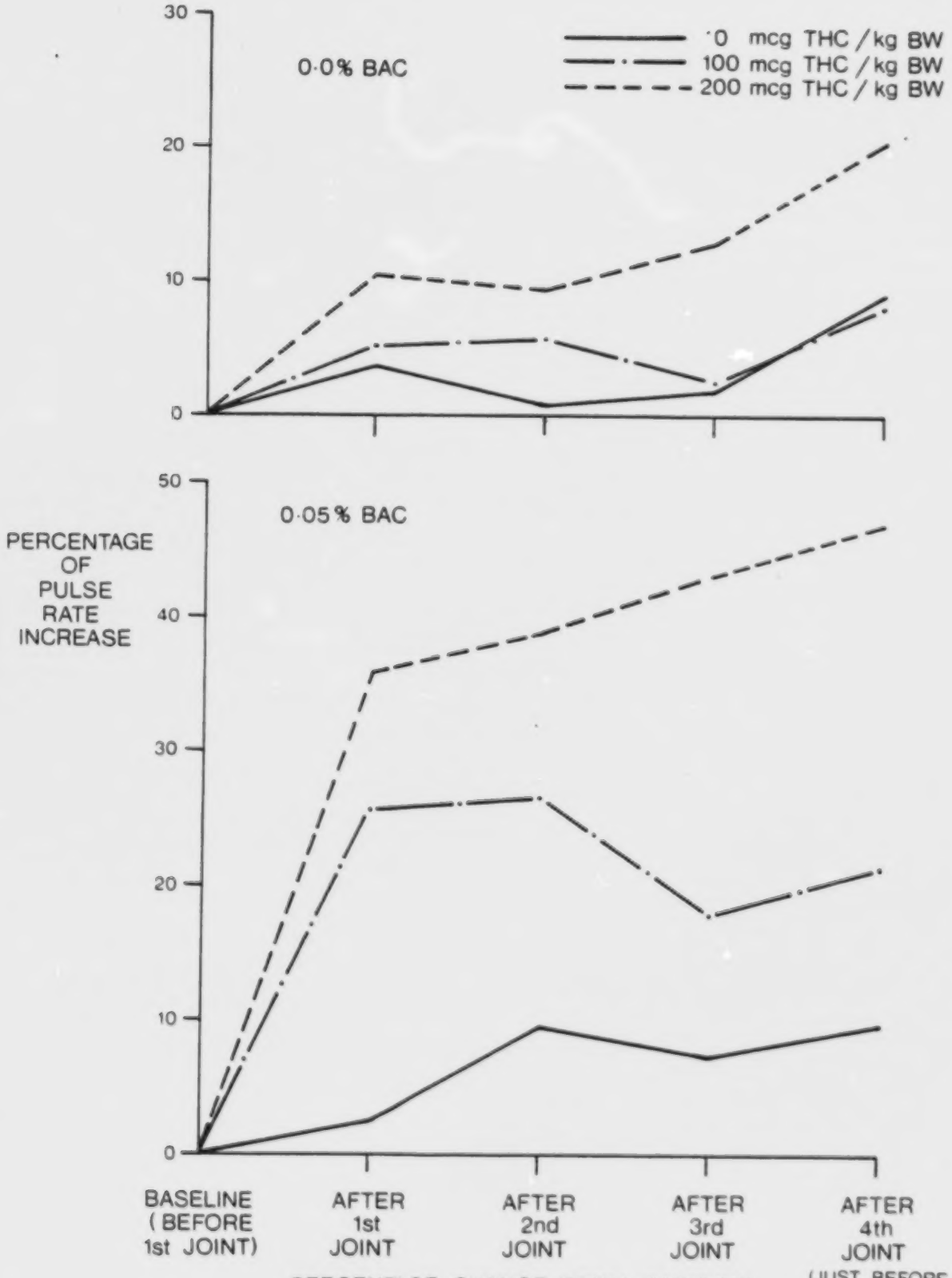

0 mcg THC / kg BW
100 mcg THC / kg BW
200 mcg THC / kg BW
0·0% BAC
0·05% BAC
PERCENTAGE OF PULSE RATE INCREASE
30
20
10
0
50
40
30
20
10
0
BASELINE (BEFORE 1st JOINT)
AFTER 1st JOINT
AFTER 2nd JOINT
AFTER 3rd JOINT
AFTER 4th JOINT (JUST BEFORE DRIVING)
PERCENTAGE CHANGE FROM BASELINE

FIGURE 5

Performance Measures

Appendix D contains analyses of covariance results and adjusted means for both the evening and morning after runs for each of the 22 variables. Appendix E contains mean power spectra of steering wheel angle for the velocity maintenance task for each of the treatment groups, adjusted for the baseline values. Tables 4 and 5 show for the evening and morning-after runs respectively the covariate p values, ie., the significance level of the test showing the reduction of the error variance attributable to the covariate. The fact that in most cases p values are highly significant indicates that much of the inter-subject variability evident in the evening and morning after runs could be explained by inter-subject variability in baseline performance. Hence, a significant increase in the precision of the analysis of treatment effects was achieved by including the covariate.

The bridge and obstacle tasks did not yield significant results mainly because the bridge tubes and the obstacle were hit so few times. Out of 264 occasions in which all tubes were released requiring a stop, there were only 8 occasions where subjects hit some tubes - no particular treatment effect was evident. Table 6 shows mean number of tubes hit for the left and right gaps combined. Speed of approaching the bridge was not significantly affected by either treatment.

Table 7 shows the data from the obstacle task. The dummy was hit on 14 out of 70 occasions. Again no consistent dose-response pattern was evident.

TABLE 4

EVENING RUN: SIGNIFICANCE LEVEL OF COVARIATE (BASELINE PERFORMANCE) FOR EACH DRIVING TASK

	COVARIATE	P VALUES
SECONDARY TASK:	TIME	.0001
	ST DEV TIME	NS
	NO. CORRECT	NS
VELOCITY MAINTENANCE:	VELOCITY	.0001
	ST DEV VEL	NS
	TOTAL POWER	NS
	% AREA > .4	.0866
	0-.2HZ/0-.4 HZ (PEAK FREQ)	NS
CURVE FOLLOWING:	RUNWAY VELOCITY	.0018
	ST DEV VEL	.0508
	OPEN ROAD VELOCITY	.0118
	ST DEV VEL	NS
	AVG. MAX BRAKE PRESS	.0007
	AVG. MAX ACCELERATION	.0001
BRIDGE:	VELOCITY	.0002
CAR FOLLOWING:	HEADWAY	.0001
	ST DEV HEADWAY	.0002
OPEN ROAD:	VELOCITY	.0001
	ST DEV VELOCITY	.0001
ROUTE SIGN FOLLOWING:	READING DIST.	NS
	TIME TO COMPLETE	.0314

TABLE 5

MORNING-AFTER RUN: SIGNIFICANCE LEVEL OF COVARIATE (BASELINE PERFORMANCE) FOR EACH DRIVING TASK

	COVARIATE	P VALUES
SECONDARY TASK:	TIME	NS
	ST DEV TIME	NS
	NO. CORRECT	NS
VELOCITY MAINTENANCE:	VELOCITY	.0504
	ST DEV VELOCITY	NS
	TOTAL POWER	.0014
	% AREA > .4 HZ	.0021
	0-.2HZ/0-.4 HZ (PEAK FREQ)	.0470
CURVE FOLLOWING:	RUNWAY VELOCITY	NS
	ST DEV VELOCITY	.0044
	OPEN ROAD VELOCITY	NS
	ST DEV VELOCITY	NS
	AVG MAX BRAKE PRESS	.0539
	AVG MAX ACCELERATION	.0006
CAR FOLLOWING:	HEADWAY	.0001
	ST DEV HEADWAY	NS
OPEN ROAD:	VELOCITY	NS
	ST DEV VELOCITY	.0005
ROUTE SIGN FOLLOWING:	READING DIST	.0001
	TIME TO COMPLETE	NS

TABLE 6

BRIDGE RESULTS.

MEAN NUMBER OF TUBES HIT FOR LEFT AND RIGHT GAPS COMBINED

MARIJUANA mcg THC/kg BW		0		100		200	
ALCOHOL % BAC							
0	BASELINE	0.136	1.17*	0.083	1.33	0.139	1.00
	TREATMENT	0.159		0.125		0.139	
0.05	BASELINE	0.225	0.33	0.176	0.16	0.156	0.54
	TREATMENT	0.075		0.028		0.084	
0.08	BASELINE	0.225	1.00				
	TREATMENT	0.225					

* RATIO OF TREATMENT/BASELINE; THE HIGHER THE RATIO, THE WORSE THE PERFORMANCE

TABLE 7

OBSTACLE DATA

NUMBER OF HITS

(NUMBER OF SUBJECTS)

MARIJUANA mcg THC/kg BW	0	100	200
ALCOHOL % BAC			
0	3 (11)	1 (10)	2 (10)
0.05	1 (10)	4 (10)	0 (9)
0.08	2 (10)		

Evening Treatment Effects

(i) Marijuana Alcohol Interaction Effects

Results from the two-way analysis of covariance showed no significant interaction effects at a = .05 for each of the 22 variables except for one namely, "standard deviation of velocity on the open road" (p = .048) Lack of significant interaction effects suggests that the effects of marijuana and alcohol are additive for the variables examined. Consequently, the main effects of marijuana and alcohol were directly interpretable. Nevertheless, all pairwise comparisons among the individual treatments were computed including those variables which did not yield significant main effects (see Appendix D).

(ii) Alcohol Treatment Effects

Because of the nature of the experimental design only one contrast crossed the three levels of marijuana, specifically 0% versus 0.05%. This main effect contrast was found to be statistically significant (a = .05) for three variables (Table 8), namely; (1) peripheral detection: number correct, (2) curve following open road: mean velocity, and (3) open road: mean velocity. The individual treatment means adjusted for the covariate for these three driving variables are plotted in Figures 6 and 7. The fewer number of correct responses to the peripheral detection task by the .05% alcohol group as compared to the 0% alcohol group was in the expected direction. However, the significantly higher number of correct responses displayed by the .08% alcohol group as compared to the .05% alcohol group (Table 8, Figure 7) cannot be explained.

The mean velocities for both the curve following open road and open road manoeuvres were significantly higher for the .05% group as compared to the 0% alcohol group. The comparison of the .08% alcohol group to the lower doses of alcohol at the 0 level of marijuana did not yield any significant differences (Table 8, Figure 6). However it should be noted that comparisons of the 0% and .05% alcohol groups were based on sample sizes of 23 and 24 subjects whereas comparisons of the .08% alcohol groups versus lower doses were based on considerably smaller sample sizes.

(iii) Marijuana Treatment Effects

The nature of the experimental design resulted in main effects of marijuana being estimated across alcohol levels of 0% and 0.05% only. For none of the variables were the overall main effects statistically significant at the .05 level, although for two variables, namely, (1) lead car following: mean headway, and (2) lead car following: standard deviation of headway, main effects were close to significance (Appendix D). Although plots of the individual treatment means adjusted for the covariate for these two driving variables (Figures 8 and 9) suggest interaction effects between marijuana and alcohol, these effects were found to be not significant (p=.26). The performance for both of these driving tasks had yielded large variations as indicated by the respective coefficients of variation, namely 20% for mean headway and 36% for standard deviation of headway.

The adjusted mean values and the pairwise contrasts of the main effects for these two variables are given in Table 9. The results showed that mean headway increased with marijuana dose and that the highest dose of marijuana was associated with greater headway variability than the lower marijuana doses. An increase in headway tends to increase headway variability since headway changes became more difficult to detect.

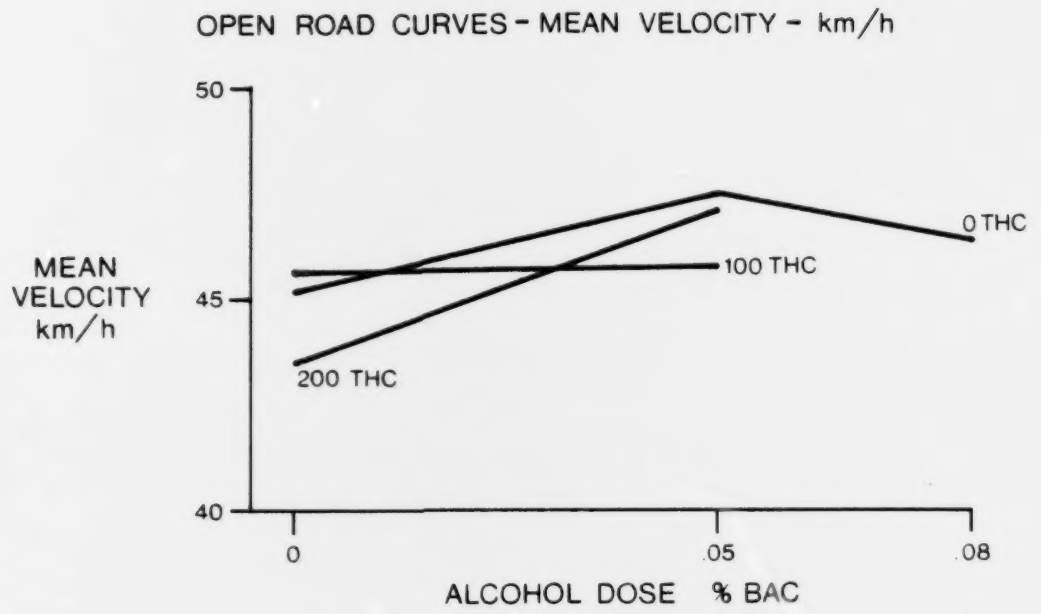
TABLE 8

ALCOHOL TREATMENT EFFECTS

EVENING RUN

	Alcohol Level (% BAC)			P-values of Contrasts*		
Variable	0	0.05	0.08	0 vs .05	0 vs .08	.05 vs .08
Secondary Task: No. Correct						
N	23	25	8			
Adjusted Mean	45.2	42.5	46.7	0.004	0.18	0.008
Curve Following: Open road velocity (KPH)						
N	23	24	9			
Adjusted Mean	44.7	46.8	46.4	0.026	0.39	0.43
OpenRoad: Velocity (KPH)						
N	23	24	10			
Adjusted Mean	47.4	49.3	49.5	0.023	0.35	0.92

* Contrasts for 0 vs .05 are based on pooled effects across 3 levels of marijuana. Contrasts for 0 vs .08 and .05 vs .08 are at the 0 level of marijuana only.


OPEN ROAD CURVES - MEAN VELOCITY - km/h
MEAN VELOCITY km/h
50
45
40
0 THC
100 THC
200 THC
0
.05
.08
ALCOHOL DOSE % BAC

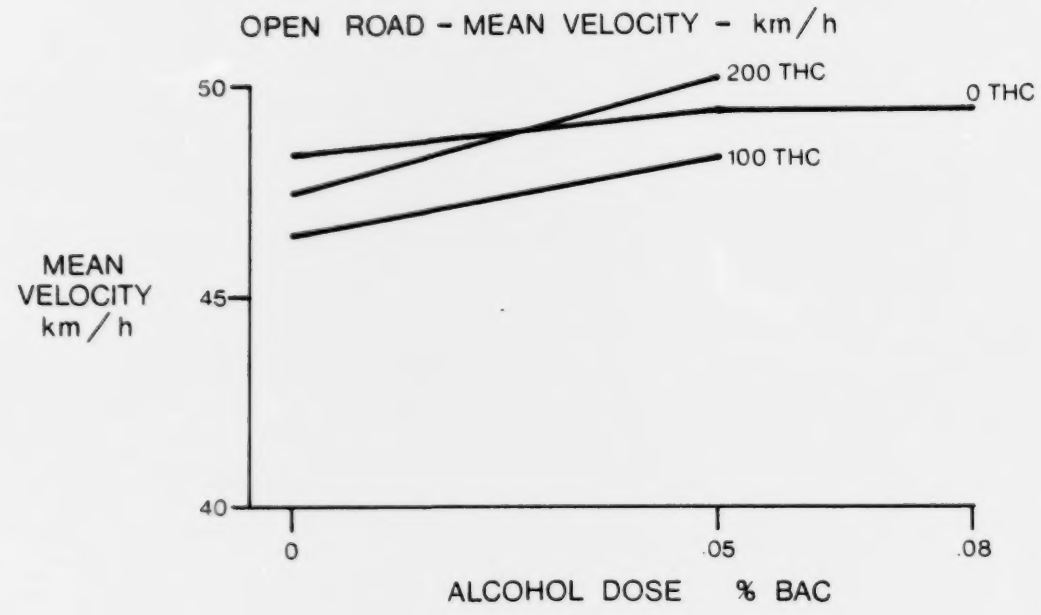

OPEN ROAD - MEAN VELOCITY - km/h
MEAN VELOCITY km/h
50
45
40
200 THC
0 THC
100 THC
0
.05
.08
ALCOHOL DOSE % BAC

FIGURE 6

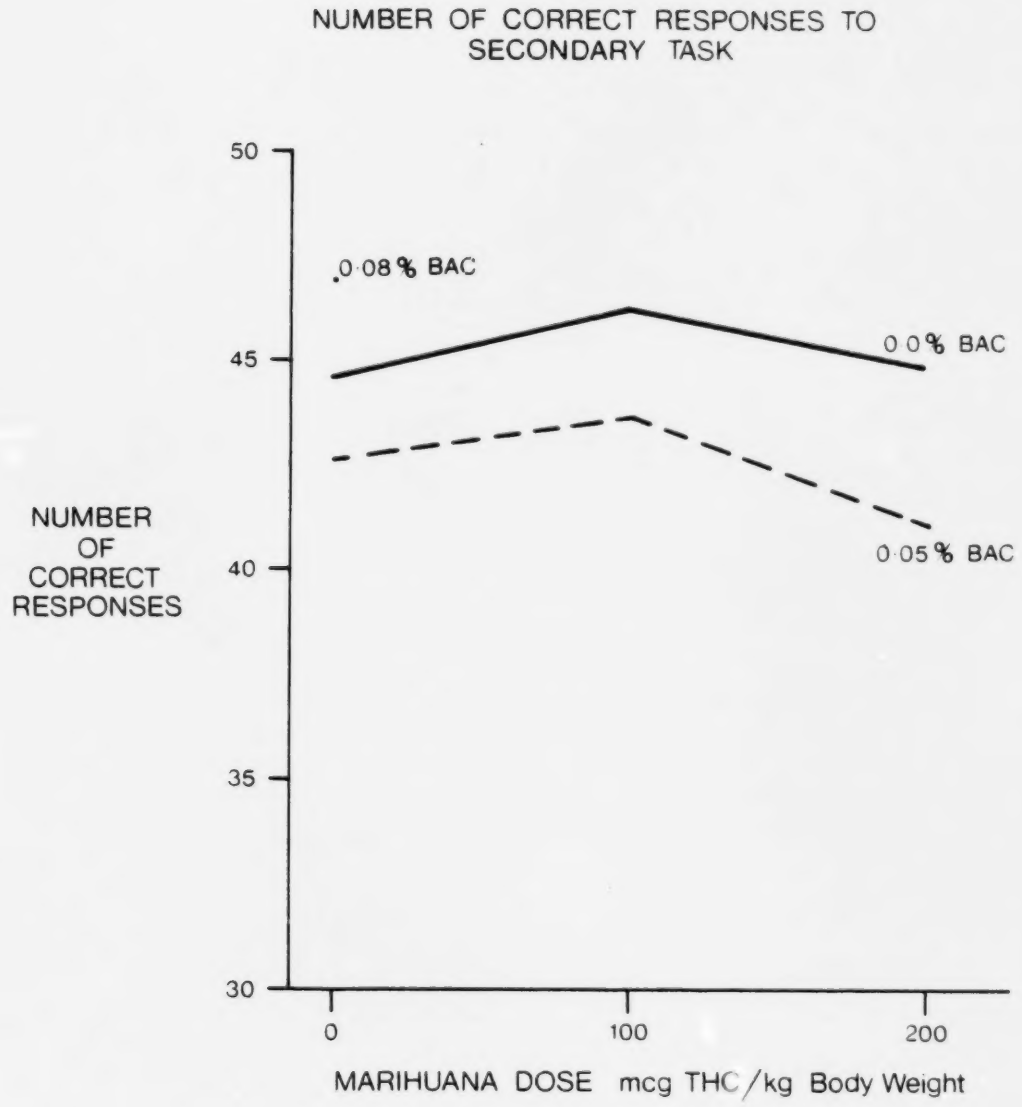

NUMBER OF CORRECT RESPONSES TO SECONDARY TASK
50
45
40
35
30
NUMBER OF CORRECT RESPONSES
.0·08% BAC
0·0% BAC
0·05% BAC
0
100
200
MARIHUANA DOSE mcg THC/kg Body Weight

FIGURE 7

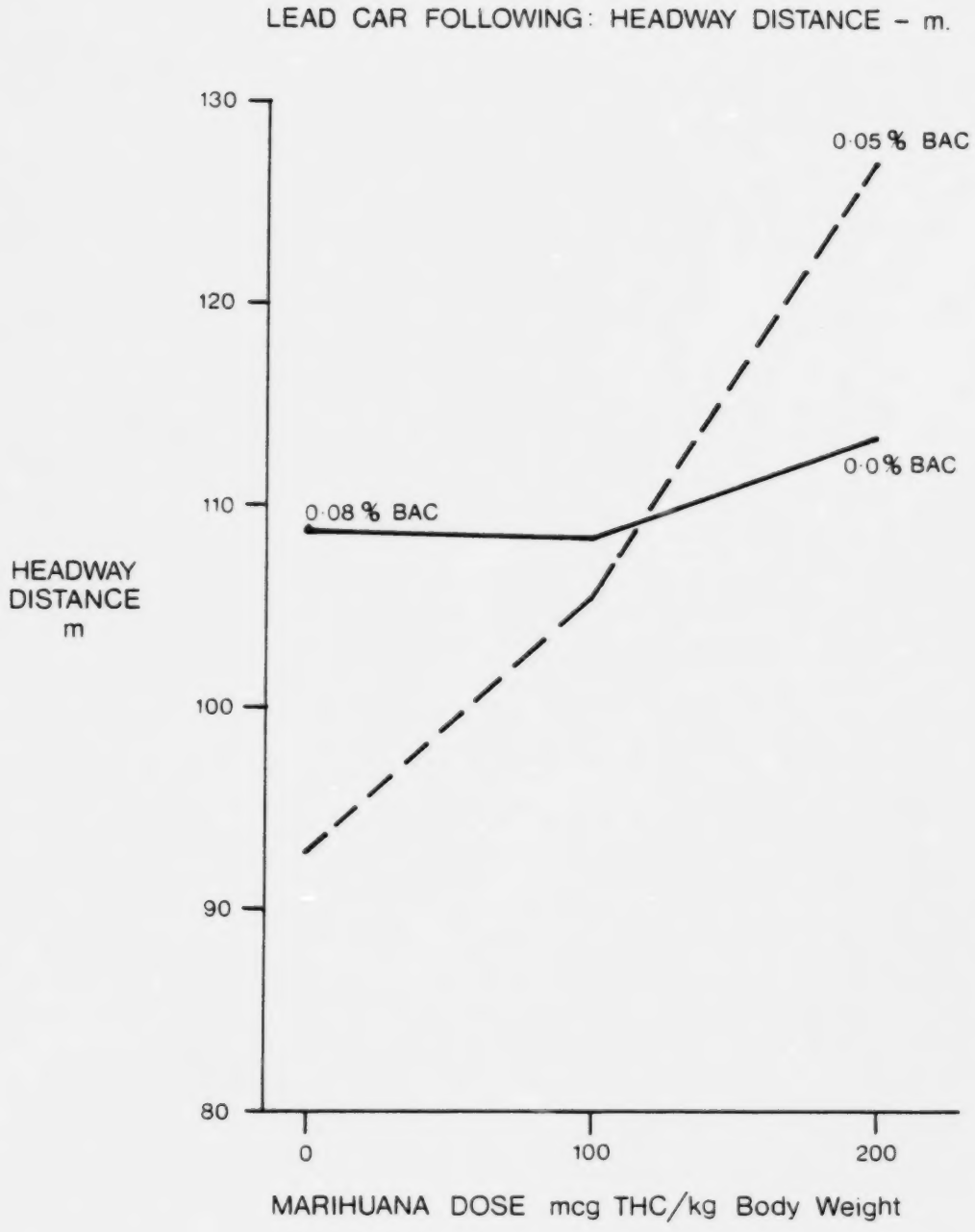

LEAD CAR FOLLOWING: HEADWAY DISTANCE – m.
130
120
110
100
90
80
HEADWAY DISTANCE m
0·05 % BAC
0·0 % BAC
0·08 % BAC
0
100
200
MARIHUANA DOSE mcg THC/kg Body Weight

FIGURE 8

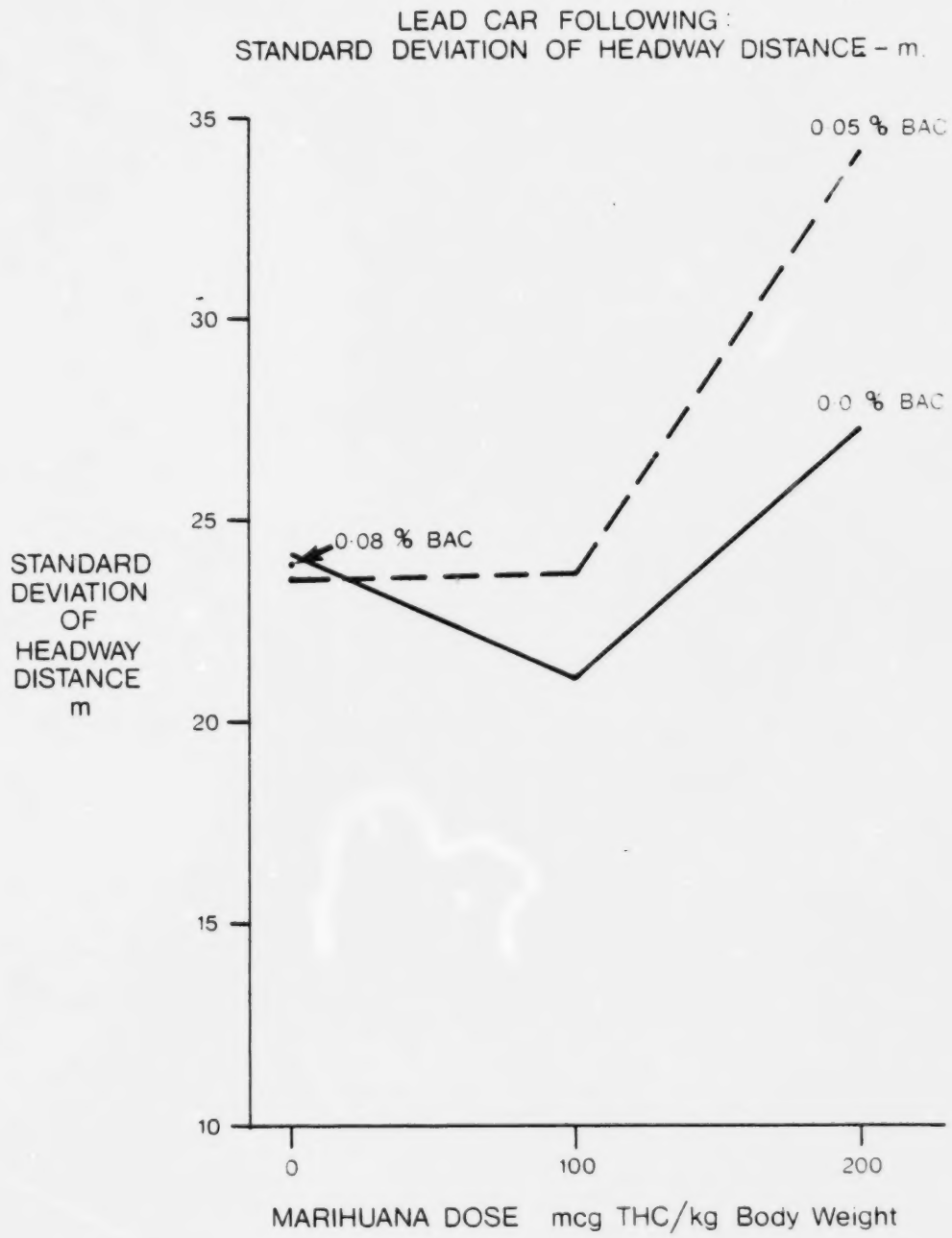

LEAD CAR FOLLOWING :
STANDARD DEVIATION OF HEADWAY DISTANCE – m.
35
30
25
20
15
10
0 05 % BAC
0 0 % BAC
0·08 % BAC
STANDARD DEVIATION OF HEADWAY DISTANCE m
0
100
200
MARIHUANA DOSE mcg THC/kg Body Weight

FIGURE 9

TABLE 9

MARIJUANA TREATMENT MAIN EFFECTS

EVENING RUN

Variable	Marijuana Level (mcg/hg B.W.) 0	100	200	P-values of Main Effect Contrasts* 0 vs 100	0 vs 200	100 vs 200
Lead Car Following: Mean Headway(M)						
N	11	11	14			
Adjusted mean	100.9	107.0	120.1	0.52	0.042	0.16
Lead Car Following: Standard Deviation of Headway(M)						
N	11	11	14			
Adjusted mean	23.8	22.3	30.7	0.72	0.085	0.042

* Analysis of covariance given in Appendix D

Morning-After Treatment Effects

The morning after treatment effects were determined on the basis of groups of 7, 5, 7 and 7 in the placebo, 200 mcg THC per kg/B.W., combination 0.05% BAC and 200 mcg THC per kg/B.W. and 0.08% BAC groups respectively. Velocity on the open road curves was found to be significantly slower ($p < 0.005$) for the 0.08% BAC treatment group compared to the other three groups. This was the only significant treatment effect. (See Table 10)

TABLE 10

SIGNFICANT MORNING AFTER

TREA MENT EFFECTS

ALCOHOL AND MARIJUANA TREATMENT LEVELS	0,0	0,200	0.05,200	0.08	
N	7	5	7	7	
VARIABLE	ADJUSTED MEAN VALUES				P VALUE
CURVE FOLLOWING:					
OPEN ROAD VELOCITY KPH	50.9	51.0	48.3	43.2	0.0046

Questionnaire Results

Subjects completed two questionnaires. The first, given on the baseline night, determined their normal and maximum consumption of marijuana and alcohol and their likelihood of driving afterwards. The second questionnaire was given on the treatment night and asked the subjects about the type of treatment they thought they had received how much they were affected by it, the administration procedure for the marijuana smoking and whether they would normally drive after such treatments.

After treatment, between 27% and 75% of the groups receiving placebo marijuana, thought they had received an active dose. Of the subjects receiving the high dose of marijuana about one quarter thought they had received little or no drug (See Figure 10). In groups receiving placebo alcohol, confusion about the treatment increased with the marijuana dose - 54% of the 0% BAC - 200 mcg THC treatment group thought they had received a significant amount of alcohol (See Figure 11). Subjects were asked to rate the marijuana dose. As shown in Figures 12 and 13 the average rating increased with increasing marijuana dose and with the addition of alcohol.

When subjects were asked over what period they would normally consume the marijuana they had just smoked, 60% of the subjects receiving the high dose said they would normally smoke it over the same (2 hours) or longer period; 40% of the subjects receiving the low dose and 14% of the subjects receiving placebo marijuauna responded likewise. The majority of subjects found the smoking schedule acceptable - but there was a tendency for subjects receiving the lower marijuana treatment to find the inhalation period too short. Appendix F shows the questionnaire results in detail.

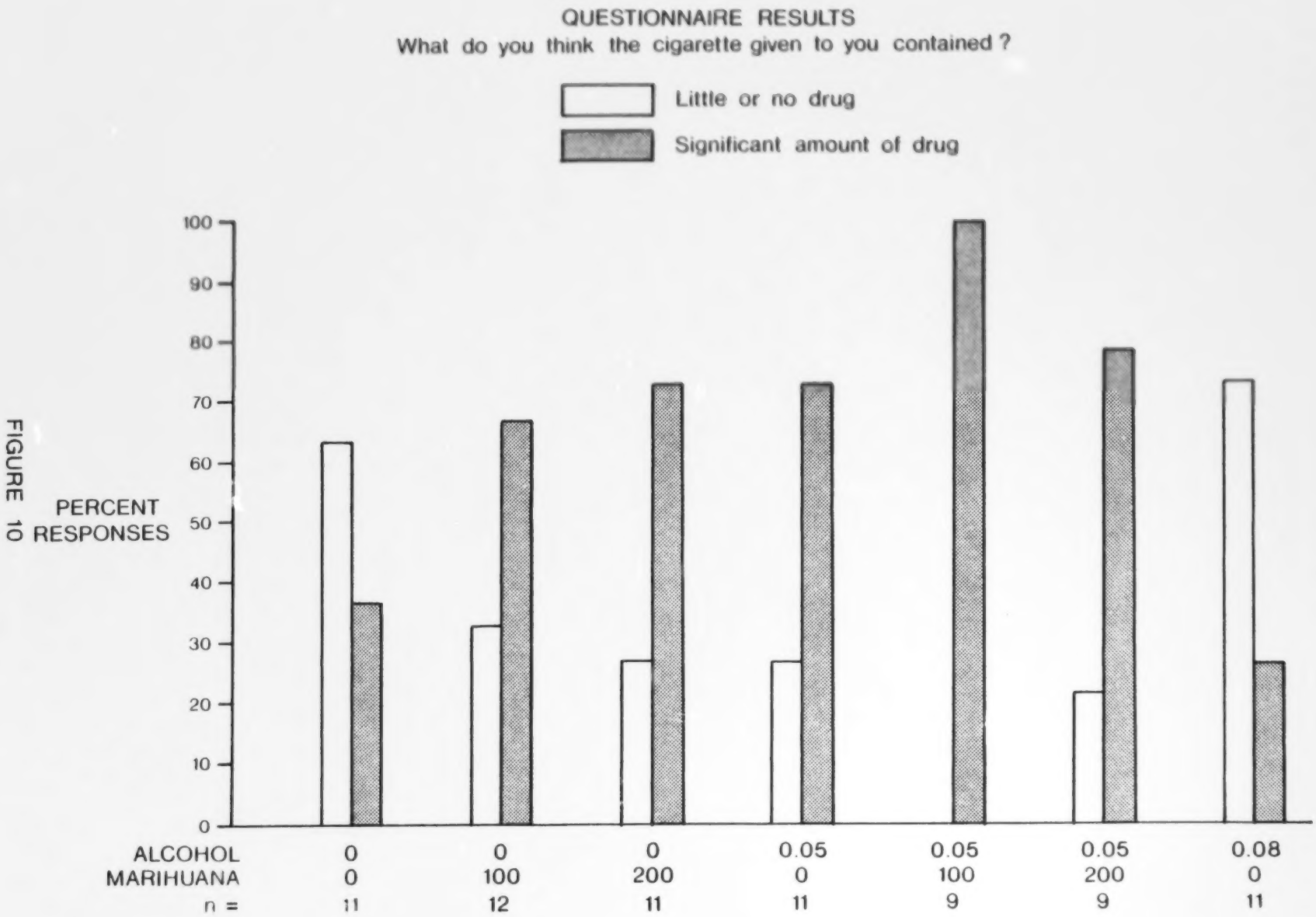

QUESTIONNAIRE RESULTS
What do you think the cigarette given to you contained ?
Little or no drug
Significant amount of drug
PERCENT RESPONSES
100
90
80
70
60
50
40
30
20
10
0
ALCOHOL 0 0 0 0.05 0.05 0.05 0.08
MARIHUANA 0 100 200 0 100 200 0
n = 11 12 11 11 9 9 11

FIGURE 10

QUESTIONNAIRE RESULTS

What do you think the drink given to you contained?

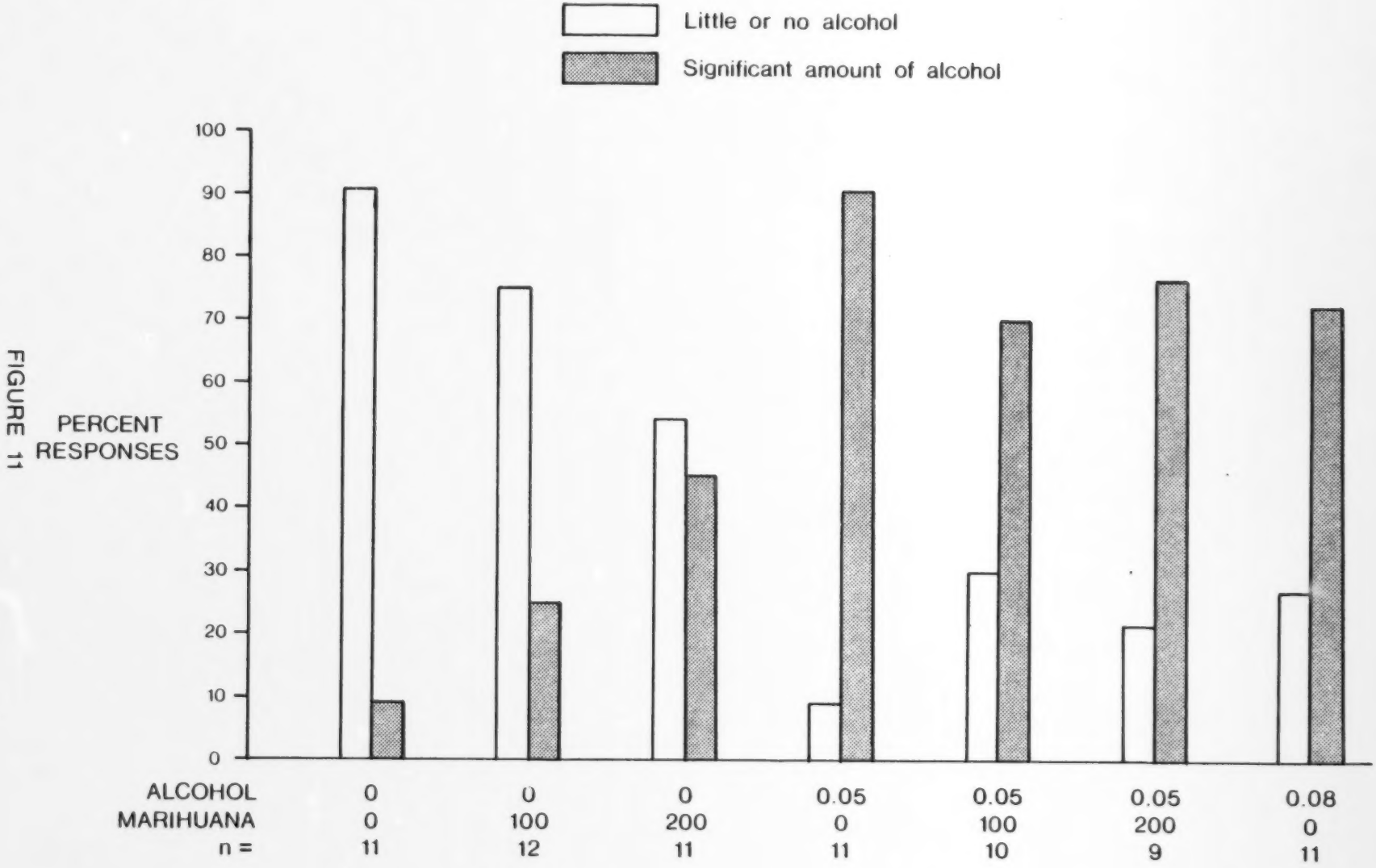


FIGURE 11

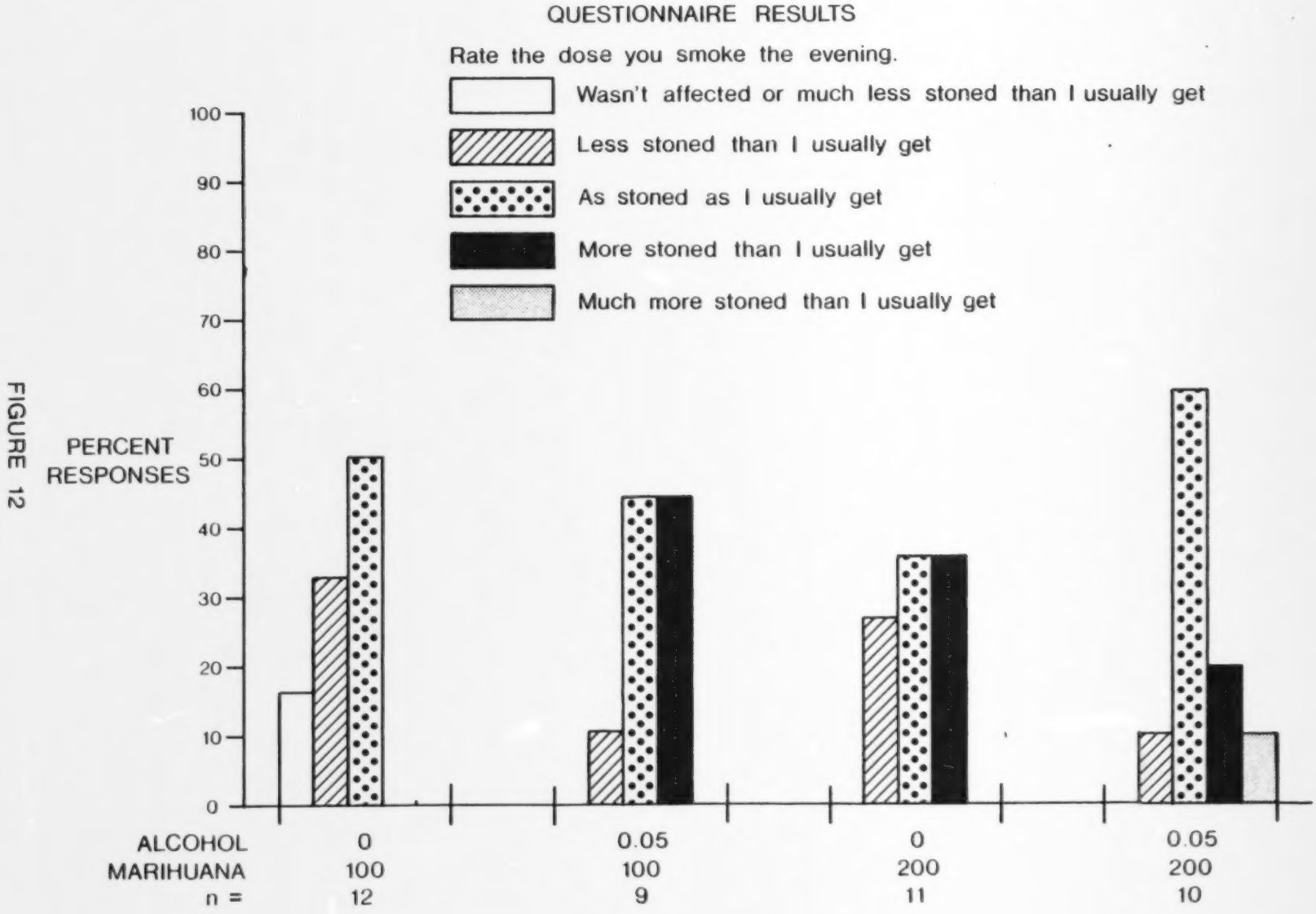

QUESTIONNAIRE RESULTS
Rate the dose you smoke the evening.
Wasn't affected or much less stoned than I usually get
Less stoned than I usually get
As stoned as I usually get
More stoned than I usually get
Much more stoned than I usually get
PERCENT RESPONSES
100
90
80
70
60
50
40
30
20
10
0
ALCOHOL
MARIHUANA
n =
0
100
12
0.05
100
9
0
200
11
0.05
200
10

FIGURE 12

QUESTIONNAIRE RESULTS

When you smoke how frequently do you get as high as you were this evening.

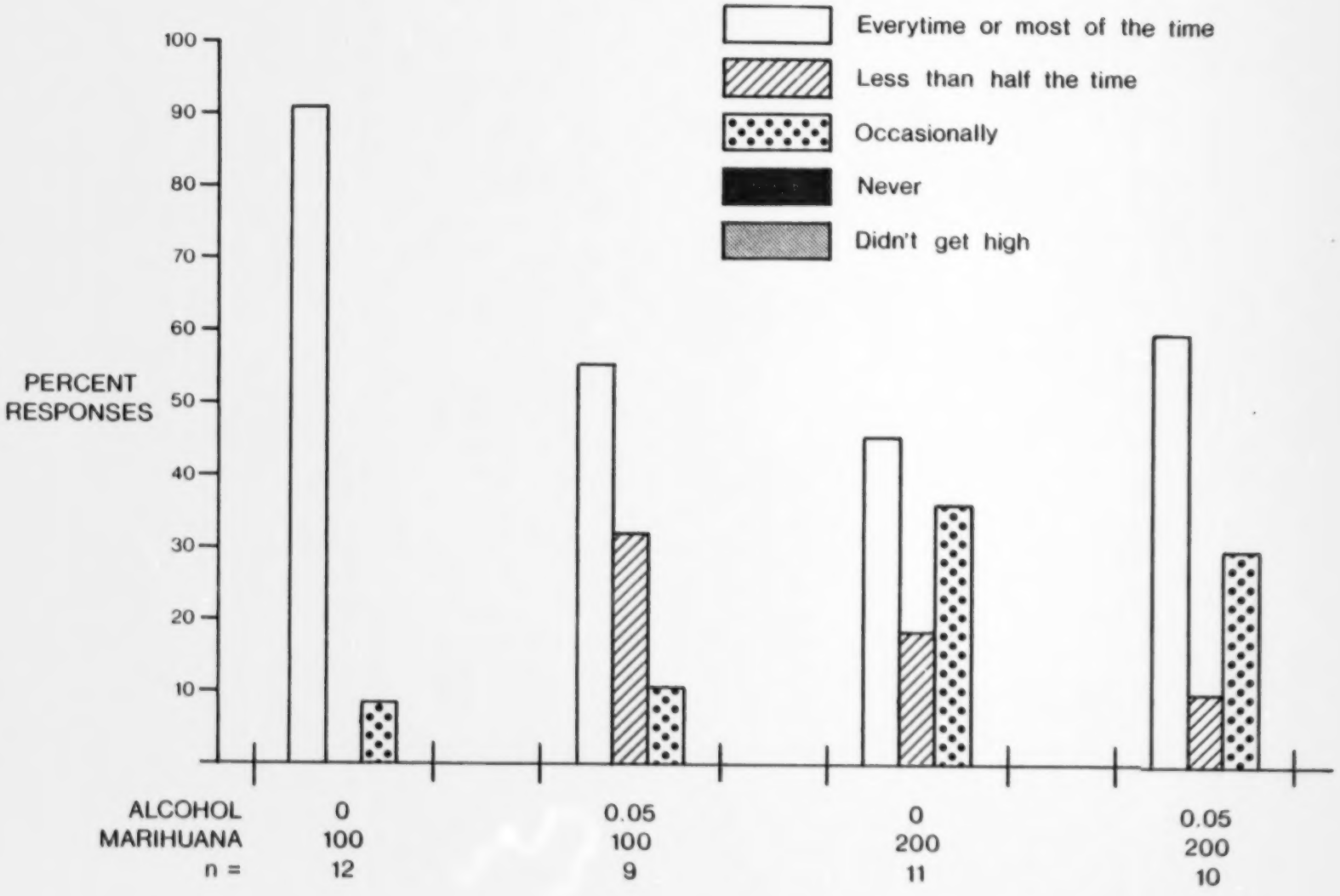


FIGURE 13

DISCUSSION

The results of this study conform to the results of other studies. Alcohol has been shown to be associated with speeding accidents (Perchonek, 1978). Smiley et al (1974) in a velocity maintenance task using an instrumented car found that subjects on the 0.06% alcohol treatment drove significantly faster than when they received placebo treatment. In this study subjects at 0.05% BAC showed significantly increased speed on curves in a section of road where speed was to some degree self-selected.

Numerous studies have shown that alcohol affects the ability to divide attention between tasks (see Moskowitz, 1973 for a review). In this study alcohol at the 0.05% level was shown to significantly reduce the number of peripheral stimuli detected. Paradoxically, detection was best for the 0.08% group. A possible explanation for this is found in divided attention studies discussed by Moskowitz (1973) which show that subjects under alcohol treatment tend to pay attention to one of the two tasks. Unfortunately the lack of a measure of lane tracking does not enable us to determine whether the 0.08% group tracked more poorly as a consequence of performing better on the secondary task.

The increase in headway under marijuana treatment indicates either some caution on the part of the subjects or less motivation or interest in keeping up with the car in front. Other studies have also found marijuana to be associated with similar behaviour, for example slower speeds (Le Dain, 1972; Casswell, 1977) and fewer overtaking maneuvres (Smiley et al, 1981). Reeve et al (1983) in a preliminary report on a closed course experiment involving alcohol and marijuana reported that marijuana was more likely to cause excessive cautiousness on certain tasks than was alcohol.

Performance measures which were significantly affected by either marijuana or alcohol treatment showed, in most cases, small absolute changes. In this respect, these results are typical of studies of alcohol effects on driving which report statistically significant but small changes in endurance. The fact that the changes are small, eg. a mean increase of 1.3 kph on the open road curve following task due to alcohol treatment, does not mean they are of no practical significance. Alcohol is known to be involved in approximately 50% of fatal accidents. In any driving experiment one must take a very small sample of behaviour relative to the amount of time a subject usually spends driving. The finding of statistically significant differences, albeit small, in a few minutes of driving at low levels of alcohol can mean significant increase in risk of accident involvement over years of driving with many drivers and higher levels of alcohol.

A major drawback of this study is a lack of a measure of lateral position. Steering movement patterns were unchanged under marijuana treatment, which is partial but insufficient evidence that tracking performance was not affected. In similar studies using normal lane sizes Attwood et al (1981) and Casswell (1977) did not find marijuana affected lane position control at doses up to 150 mcg THC/kg B.W.

However, in studies using narrow lanes, tracking has been shown to be affected by marijuana. The high number of cones hit in the placebo condition in the Le Dain (1977) study suggests that very narrow lanes were used for examining lateral position control, and that under these conditions, marijuana impaired lane tracking. Laboratory studies where tracking requirements are more stringent and the tracking task more clearly defined have also shown impairment due to marijuana. (Smiley et al, 1981; Manno et al, 1971; Reid et al 1973).

Driving on the road is a much less precisely defined task than tracking or performing visual search tasks in a laboratory. This lack of precision increases variability in performance and makes it necessary to test larger numbers of subjects on-the-road to obtain the same sensitivity to drug effects that can be obtained in the laboratory. Moreover, on-the-road tests present many more logistical and operational problems than do laboratory tests. In this case instrumentation problems, caused in large part by environmental conditions, prevented the testing of the desired number of subjects in each group. The lack of a sufficient number of subjects may have precluded finding clearer alcohol and drug effects.

CONCLUSIONS

The effects of marijuana at dose levels of 0, 100 and 200 mcg THC/kg B.W. combined with alcohol at 0 and 0.425 gm/kg B.W., as well as alcohol alone at 0.68 gm/kg B.W., were assessed on a wide range of driving tasks. Marijuana was found to be associated with increased headway in the car following task and, at the high dose level an increase in the variability of headway. Alcohol was found to be associated with decreased peripheral light detections for the low dose only and faster speeds on curves in an area where speed was to some degree self-selected, again being significant for the low dose vs placebo comparison only.

Both marijuana and alcohol were found to have small effects on measures of driving performance at the dose levels tested. The effects due to alcohol were generally larger than those due to marijuana. Even at BAC levels of .08%, alcohol was found to have relatively small effects though it is known that at this level, the risk of accident involvement rises sharply. Generally, marijuana and alcohol did not appear to interact.

No "hangover" effects were found for marijuana treatments. Only one variable, velocity on open road curves, was significantly affected by the high dose of alcohol the morning after treatment.

The relatively small effects found in this study are attributed to the relatively high variability of data associated with on-the-road driving in contrast to that associated with the more controlled tasks used in laboratories and simulators. Although the design called for 12 subjects per cell, fewer numbers were achieved due to instrumentation problems. It would appear that the numbers obtained were too few in the face of high levels of variability to provide clearer results. In addition, clearer results would likely be obtainable if higher dose levels could be utilized.

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A P P E N D I X A

BLOOD ALCOHOL CONCENTRATION CALCULATION METHOD

ETHANOL DOSING SCHEDULE - I (500 mg/l)

That dose of vodka and orange juice (or tonic water) required to achieve a nominal "instantaneous" blood alcohol level (BAL) of 640 mg/l, and a steady state level after some 1.5 hours of drinking of approximately 500 mg/l through the use of repeated, timed oral doses (based on 40% v:v spirits)

A: Subject's gross weight = _____lbs / 2.205 = _____kg;

B: Body fat (see separate sheet) = _____%; or 0._____ fat fraction.

CALCULATIONS:

C: (Gross wt _____kg x (fat fraction 0._____) = _____.kg fat mass;

D: (Gross wt _____kg) - (fat mass _____kg) = _____kg lean body mass;

E: (Lean body mass _____kg) x 0.732 = _____litres total body water;

F: (Total body water _____l) x 2.028 = _____ml VODKA loading dose;

G: (Dose of VODKA _____ml) x 1.67 = _____ml of MIX (diluant) to add;

H: (Dose of VODKA _____ml) + _____ml of MIX = _____ml loading volume;

I: Divide this volume into 3 equal parts and give as Drinks #1, #2, & #3:

DRINK #1 = _____ml DRINK #2 = _____ml DRINK #3 = _____

J: Subsequent (maintenance) drinks are given over 20 minutes at 30-minute intervals (as per protocol) as 0.2766 ml of VODKA per kg of lean body mass — diluted with 1.67 times this amount of MIX:

Maintenance DRINKS = _____ml VODKA + _____ml MIX = _____ml

ETHANOL DOSING SCHEDULE - II (800 mg/1)

That dose of vodka and orange juice (or tonic water) required to achieve a nominal "instantaneous" blood alcohol level (BAL) of 1025 mg/1, and a steady state level after some 1.5 hours of drinking of approximately 800 mg/1 through the use of repeated, timed oral doses (based on 40% v:v spirits)

A: Subject's gross weight = _____lbs / 2.205 = _____kg;

B: Body fat (see separate sheet) = _____%; or 0._____ fat fraction.

CALCULATIONS:

C: (Gross wt _____kg x (fat fraction 0._____) = _____kg fat mass;

D: (Gross wt _____kg) - (fat mass _____kg) = _____kg lean body mass;

E: (Lean body mass _____kg) x 0.732 = _____litres total body water;

F: (Total body water _____l) x 3.244 = _____ml VODKA loading dose;

G: (Dose of VODKA _____ml) x 1.67 = _____ml of MIX (diluant) to add;

H: (Dose of VODKA _____ml) + _____ml of MIX = _____ml loading volume;

I: Divide this volume into 3 equal parts and give as Drinks #1, #2, & #3:

DRINK #1 = _____ml DRINK #2 = _____ml DRINK #3 = _____

J: Subsequent (maintenance) drinks are given over 20 minutes at 30-minute intervals (as per protocol) as 0.2766 ml of VODKA per kg of lean body mass — diluted with 1.67 times this amount of MIX:

Maintenance DRINKS = _____ml VODKA + _____ml MIX = _____ml

APPENDIX B

SUBJECT INTERVIEW INSTRUMENTS AND CONSENT FORM

APPENDIX B-1

TELEPHONE PARTICIPANT INTERVIEW FORM

Interviewer _____

Date _____ Name _____

Address _____

Phone _____ Best time to call _____

Age _____ Height _____ Weight _____

Vision Right _____ Left _____ (Corrected) _____

Availability _____

How many miles do you drive per year? _____,000.

Do you currently drive a car? Yes _____ No _____.

Valid Driver's License? Yes ____ No _____ How long _____ .

Current Drug Use (past 3 months) _____

Do you drink tea or coffee? _____ Total cups/day _____ .

Over the counter drugs? Yes _____ No _____

If yes, specify drug(s) and frequency of use _____

_____

Prescription drugs? Yes _____ No _____ If yes, specify drug(s) and frequency of use. _____

Tobacco? Yes _____ No _____ If yes, how many/day? _____

Marijuana? Yes _____ No__If yes, how often? _____

How much do you usually smoke? _____

Do you drink alcoholic beverages? Yes _____ No _____

Usual drink? _____

How much? _____ How often? _____

Subject Name

In the last two months have you used any of the following? If so, how often?

	No	Once	Twice	Times/week
Amphetamines				
Barbiturates				
Cocaine				
Hallucinogens (LSD, peyote, psilocybin, etc)				
Quaaludes				
Sedatives				
Tranquilizers				
Other (Please list)				

Subject Name

General Health

Last Doctor's visit_____ Reason for visit_____

Any problems with the following:

Heart Kidneys Liver Ulcers Diabetes

Nervous Disorders Respiratory Coordination

Any problems with alcohol use such as the following:

Nausea Vomiting Dizziness Other

Any problems with marijuana use such as the following:

Nausea Vomiting Dizziness Other

Will you be willing and able to abstain from your current drug use Yes_____ No _____

Will you be willing to give a urine sample each time you arrive at RSU? Yes_____ No _____

Subject Name _____

Current Alcohol Use (past two months)

PUT ONE CHECK MARK IN EACH COLUMN.

	Wine	Beer	Whiskey Liquor	Any Kind of Drink
3 or more times a day				
2 times a day				
Once a day				
Nearly every day				
3-4 times a week				
Once or twice a week				
2-3 times a month				
About once a month				
Less than once a month but at least once a year				
Less than once a year				
Never had it				

How often do you have as many as 5 or 6 glasses (or cans)?

	Wine	Beer	Whiskey Liquor
*Nearly every time			
*More than half the time			
Less than half the time			
Once in awhile			
Never			

How often do you have as many as 3 or 4 glasses (or cans)?

	Wine	Beer	Whiskey Liquor
*Nearly every time			
*More than half the time			
Less than half the time			
Once in awhile			
Never			

How often do you have as many as 1 or 2 glasses (or cans)?

	Wine	Beer	Whiskey Liquor
*Nearly every time			
*More than half the time			
Less than half the time			
Once in awhile			
Never			

*Proceed to next beverage

Medical Examination for Volunteers in Research Projects

(to be completed by the Volunteer)

Last Name	First Name	Middle Name	Sex	Date of Birth (Day / Month / Year)

Street Address	City	Province	Telephone No.

Marital Status ☐ Married ☐ Single ☐ Other	Next of Kin	Address

Occupation	Social Insurance Number

FAMILY HISTORY	LIVING		DEAD	
	Age if Living	State of Health	Age of Death	Cause of Death
Father				
Mother				
Brothers & Sisters				
Spouse				
Children				

PAST MEDICAL HISTORY

Is there a History of:	YES	NO	If Yes, Specify
Eye Trouble			
Nose or Throat Trouble			
Ear Trouble or Deafness			
Head Injuries			
Other Injuries			
Surgery			
Tuberculosis			
Epilepsy			
Mental Illness			
Kidney or Bladder Trouble			
Skin Disease			
Rheumatism or Joint Trouble			
Lung Disease			
Allergies			
Heart Disease			
Stomach Trouble			
Fainting Spells			
Headache			
Regular Alcohol or Drug Use			
Other			
FEMALES ONLY	YES	NO	
Menstrual Disorders			
Pregnancy			

Date of Last Menstrual Period _____

MEDICAL EXAMINATION

Height (cm) _____ Weight (kg) _____ Bp _____ Pulse _____

Urinalysis _____

Is there any abnormality of:	YES	NO	If Yes, Specify
Head or Neck			
Ear, Nose or Throat			
Eyes, Eyegrounds			
Teeth, Gums or Mouth			
Skin or Scalp			
Lungs			
Cardiovascular System			
Abdomen			
Nervous System			
Genitourinary System			
Locomotor System			
Others			

Additional Remarks by Physician

PHYSICIAN'S STATEMENT

This volunteer is ☐ acceptable ☐ not acceptable for the experimental project as stated.

_____ _____

Date Signature of Examining Physician

VOLUNTEER'S STATEMENT

I, the undersigned hereby declare that the answers given on this questionnaire, by me, regarding my health history are correct to the best of my knowledge. Having been given a satisfactory explanation of the procedures of the experiment for which I am volunteering.

_____ _____ _____

Date Signature of Volunteer Witness

Profile and Case Summary

The Minnesota Multiphasic Personality Inventory

Starke R. Hathaway and J. Charnley McKinley

M
Male

Name _____

Address _____

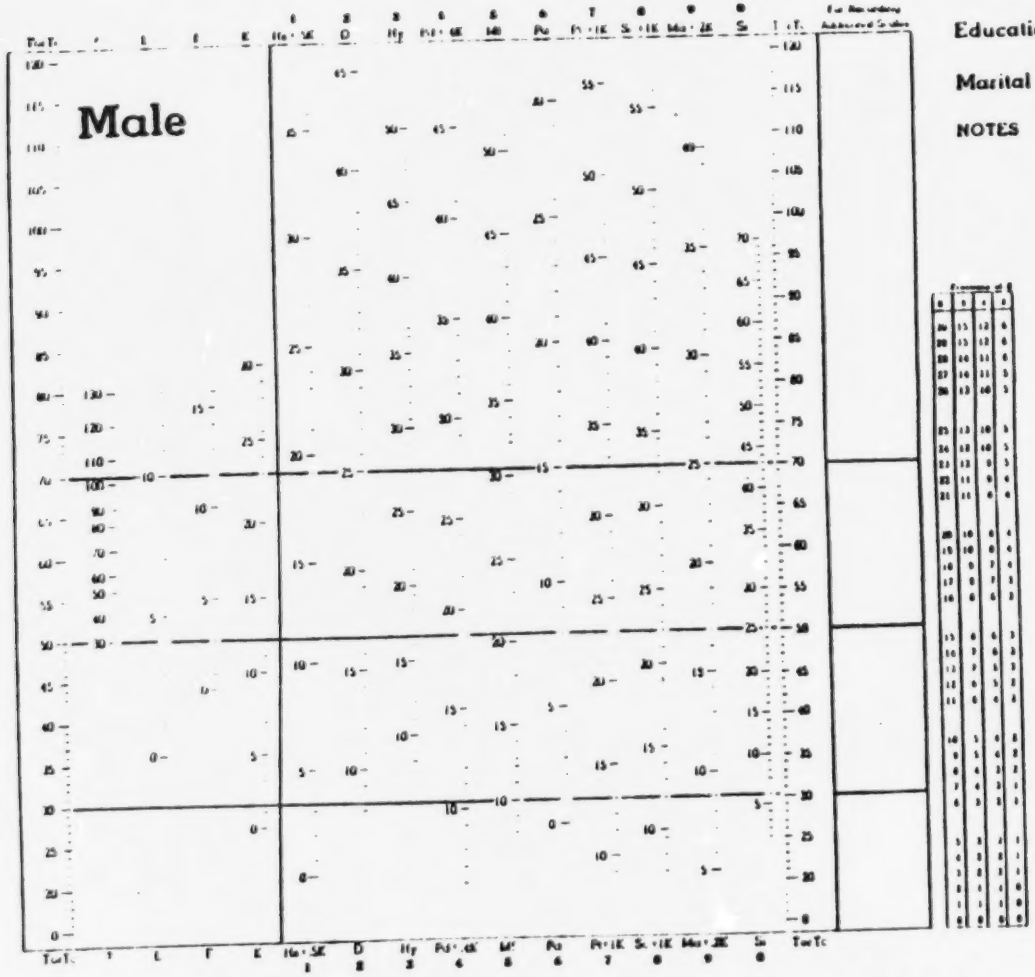
Occupation _____ Date Tested _____

Education _____ Age _____

Marital Status _____ Referred by _____

NOTES

Scorer's Initials _____



Raw Score _____

K to be added _____

Raw Score with K _____

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The Psychological Corporation, New York, N.Y.

77 1176

Signature _____ Date _____

APPENDIX B-2

CONSENT FORM

A field study of the effects of marijuana and alcohol on driving performance

I, , being of legal age for consent, hereby agree to participate in a research study designed to measure my ability to drive an instrumented car under the influence of alcohol and/or marijuana. The purposes, risks and procedures of this study have been explained to me. Questions I have had concerning the study have been answered to my complete satisfaction.

No deceit is involved in the performance of driving tests. What I am expected to do is perform as well as possible.

I will be asked to smoke cigarettes, which may or may not contain marijuana, according to a set pattern of puffing. The maximum marijuana dose will be 200 micrograms delta-9 THC per kilogram bodyweight (equivalent to about two joints). While administration of such doses to many subjects has produced no serious difficulties, there is some possibility of short-term discomfort. Use of marijuana may cause subjective 'highs', changed perceptions, anxiety, nausea, lethargy and depression. I realize that marijuana is under examination as an experimental drug for which all possible subsequent effects of long-term use still are not known. The use of marijuana may produce alterations in behavior, thinking and mood, which may range from pleasant to extremely unpleasant and my or may not recur with (or rarely, without) subsequent exposure to the drug. Acute psychotic reactions may also develop, but they are very rare.

I will receive alcohol in a vodka-orange juice mixture. The total amount of alcohol will range from 0 oz. to 1.5 oz. of 80-proof alcohol per 25 lbs. bodyweight. I will drink the alcohol over a three hour period in six drinks given at set times. No harmful effects are expected at the dose levels to be used, although I may experience some temporary discomfort, such as headaches, nausea and dizziness.

Because research has shown both marijuana and alcohol affect behavior for a number of hours after consumption, I agree to sleep in provided accomodation after the evening session is over and remain until 9:00 AM the following morning. I agree to go home from the laboratory in a cab (fare is provided) and not to drive until the following morning.

I will be required to have one blood draw after driving on the second treatment day. About 10 ml (one teaspoon of blood will be taken. I will also be required to provide a urine screen before each test session to be used to ensure I have not consumed other drugs prior to the session.

A nurse will be present whenever alcohol or marijuana are being administered and a physician, will be available at any time during the study period.

I understand that I am to arrive at treatment sessions having fasted from solid foods for the previous four hours. (On arrival I will be provided with a small meal.) I understand that I will only be permitted to smoke a maximum of two tobacco cigarettes during each of the experimental sessions. understand that I must not use mood-altering (street or prescribed), sedative, or stimulant drugs for 1 week prior to, and during the course of the study. If I am medically treated with drugs (including antihistamines) which may cause these effects, I will bring this to the attention of the Project Officer. I also agree that my use of recreational drugs, other than tobacco (the use of which, on the day of the experiment, I will record) will be limited to a time preceding the time of the experiment as follows:

1) marijuana 1 week
2) alcohol 3 days
3) caffeine 6 hours

I understand that a urine sample will be collected at the start of each session to verify that I have abstained from taking drugs, as required. If the general drug screen is negative, I will be entitled to a bonus.

I understand that after administration of alcohol and/or marijuana that I may refuse to drive if I feel that I am incapable of doing so ar that it would be unsafe.

I agree to the following payment schedule for the sessions I am asked to attend:

$30 self-titration session (overnight)*
$15 training session (no overnight)
$15 self-titration baseline session (no overnight)*
$30 baseline session (overnight)
$60 treatment session (overnight)
$20 bonus for abstaining from taking drugs prior to and during the experiment
$15 morning-after session*

I am free to withdraw from the study at anytime without prejudice. If I have any questions, I may ask them before or after I consent to participate in this study.

* must attend <u>both</u> sessions.

I understand that for the duration of the experimental driving periods, I will be considered a government employee and that, in the event of a motor vehicle accident, any damage sustained by others will be covered by the Crown. Medical expenses for injuries to myself will also be covered.

I understand that I may expect no benefits from this study other than payment of the stipulated fee.

Dated at Downsview this day of , 1983.

Witness:

Subject:

A P P E N D I X C

SUBJECT DEMOGRAPHIC DATA

APPENDIX C

Subject Demographic Data

Alcohl and Marijuana Treatments	No. of subjects per Marijuana Level			Avg. Freq. for smkng marijuana per month	Avg. No. of joints smoked	No. of subjects per Alcohol Level			Avg. Freq. for drnkng Alcohol per week	Avg. No. of drinks	Avg. Age of subjects	Avg. No. of miles driven per year
	1	2	3			1	2	3				
0,0	7	4	-	4.45	1.14	2	1	8	2.23	4.36	25.9	13,455
0,100	8	4	-	4.33	1.39	4	-	8	1.27	4.79	23.9	24,833
0,200	8	2	1	5.14	1.22	3	1	7	2.61	3.68	24.3	20,818
0.05,0	6	5	1	5.46	1.00	3	2	7	1.71	4.29	23.1	13,333
0.05,100	8	1	1	6.75	0.98	3	1	6	1.90	3.85	23.5	14.400
0.05,200	6	4	-	5.72	1.31	1	-	9	1.83	5.39	23.3	17,350
0.08	8	4	-	5.83	1.10	4	3	5	1.67	6.38	24.8	14,500

APPENDIX D

ANALYSES OF COVARIANCE, ADJUSTED MEANS AND PAIRED COMPARISONS

Appendix D-1

Evening Runs: 3 X 3 Analyses of Covariance

Alcohol	0	0.05%	0.08%
Marijuana			
0	X	X	X
100	X	X	
200	X	X	

Analyses of Covariance

1.	PHTIME	Peripheral Detection:	Mean Reaction Time
2.	PHSDTM		St. Dev. Reaction Time
3.	PCORR		Number Correct
4.	VMVEL	Velocity Maintenance:	Mean Velocity
5.	VMSDVL		St. Dev. Velocity
6.	CFRVEL	Curve Following Runway:	Mean Velocity
7.	CFRSDVL		St. Dev. Velocity
8.	CFORVEL	Curve Following Open Road:	Mean Velocity
9.	CFORSDVL		St. Dev. Velocity
10.	CFBRK		Mean Max. Brake Pressure
11.	CFACC		Mean Max Acceleration
12.	BRVEL	Bridge Task:	Mean Velocity
13.	LCHDWY	Lead Car Following:	Mean Headway
14.	LCSDHD		St. Dev. Headway
15.	ORVEL	Open Road:	Mean Velocity
16.	ORSDV		St. Dev. Velocity
17.	CORRTURN	Road Sign Following:	No. of Corr. Turns
18.	RSDIST		Distance at Which Route Sign Seen
19.	RSTIME		Time to Complete Circuit
20.	TOTPOW	Velocity Main Power Spectra:	Total Power
21.	AREA % 0.2/0.4		Peak Frequency (0-0.2HZ/0-0.4HZ)
22.	AREA % 0.0-0.4		% High Frequency Area (>0.4HZ)

PHTIME (PERIPHERAL DETECTION:MEAN REACTION TIME) 19:47 FRIDAY, MAY 3, 1985 3

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
A	3	0 5 8
M	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 58 OBSERVATIONS IN DATA SET CAN BE USED IN THIS ANALYSIS.

DEPENDENT VARIABLE: PHTIMET

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	2.08118285	0.29731172	6.73	0.0001	0.485188	12.8150
ERROR	50	2.20824912	0.04416498		ROOT MSE		PHTIMET MEAN
CORRECTED TOTAL	57	4.28943117			0.21015466		1.63990862

SOURCE	DF	TYPE III SS	F VALUE	PR > F
PHTIMEB	1	1.15825770	26.23	0.0001
A	2	0.04065881	0.46	0.6335
M	2	0.16186857	1.83	0.1706
A*M	2	0.12444992	1.41	0.2539

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	0.03570065	0.81	0.3729
A8 VS A0 & A5	1	0.00478066	0.11	0.7435
M0 VS M2 MAIN	1	0.07144541	1.62	0.2093
M0 VS M1 MAIN	1	0.14810716	3.35	0.0730
M1 VS M2 MAIN	1	0.01265399	0.29	0.5948

PARAMETER			ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT			0.50156298 B	1.83	0.0727	0.27357766
PHTIMEB			0.77462531	5.12	0.0001	0.15126140
A	0		-0.22869926 B	-1.60	0.1170	0.14337647
	5		-0.03197451 B	-0.32	0.7498	0.09972506
	8		0.00000000 B	.	.	.
M	0		-0.19415154 B	-2.01	0.0499	0.09661090
	1		-0.07016391 B	-0.65	0.5168	0.10747280
	2		0.00000000 B	.	.	.
A*M	0	0	0.20094189 B	1.35	0.1845	0.14932131
	0	1	0.22542035 B	1.47	0.1484	0.15390098
	0	2	0.00000000 B	.	.	.
	5	0	0.00000000 B	.	.	.
	5	1	0.00000000 B	.	.	.
	5	2	0.00000000 B	.	.	.
	8	0	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

A	PHTIMFT LSMEAN	STD ERR LSMEAN	PROB > ITI HO:LSMEAN=0	PROB > ITI I/J	HO: LSMEAN(I)=LSMEAN(J) 1	2	3
0	1.02373269	0.04648886	0.0001	1	.	0.3729	.
5	1.07817003	0.04048124	0.0001	2	0.3729	.	.
8	NON-EST	.	.	3	.	.	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

A	M	PHTIMFT LSMEAN	STD ERR LSMEAN	PROB > ITI HO:LSMEAN=0	PROB > ITI I/J	HO: LSMEAN(I)=LSMEAN(J) 1	2	3	4	5	6	7
0	0	1.57634078	0.07444538	0.0001	1	.	0.2036	0.9521	0.9673	0.2466	0.0730	0.7991
0	1	1.72530687	0.08617330	0.0001	2	0.2036	.	0.1793	0.1443	0.8074	0.7131	0.2909
0	2	1.54955043	0.07751790	0.0001	3	0.9521	0.1793	.	0.9797	0.2823	0.0630	0.7450
5	0	1.57212364	0.06700968	0.0001	4	0.9673	0.1443	0.9797	.	0.2486	0.0499	0.7498
5	1	1.69611126	0.07962563	0.0001	5	0.2466	0.8074	0.2823	0.2486	.	0.5168	0.4163
5	2	1.76627518	0.07026221	0.0001	6	0.0730	0.7131	0.0630	0.0499	0.5168	.	0.1192
8	0	1.60409815	0.07517236	0.0001	7	0.7991	0.2909	0.7450	0.7498	0.4163	0.1192	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

DEPENDENT VARIABLE: PHTIMFT

PARAMETER	ESTIMATE	T FOR HO: PARAMETER=0	PR > ITI	STD ERROR OF ESTIMATE
MARIJUANA 0	1.57422458	32.13	0.0001	0.04898859
MARIJUANA 1	1.71070637	29.69	0.0001	0.05762313
MARIJUANA 2	1.56791013	31.54	0.0001	0.05288205

PHSDTM (PERIPHERAL DETECTION:ST.DEV.REACTION TIME) 19:47 FRIDAY, MAY 3, 1985 7

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
A	3	0 5 8
M	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 58 OBSERVATIONS IN DATA SET CAN BE USED IN THIS ANALYSIS.

DEPENDENT VARIABLE: PHSDTMT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	0.18258272	0.02608325	1.11	0.3699	0.134798	34.2291
ERROR	50	1.17191201	0.02343824		ROOT MSE		PHSDTMT MEAN
CORRECTED TOTAL	57	1.35449473			0.15309553		0.44726724

SOURCE	DF	TYPE III SS	F VALUE	PR > F
PHSDTMB	1	0.01760449	0.75	0.3903
A	2	0.09721613	2.07	0.1364
M	2	0.05249033	1.12	0.3344
A*M	2	0.03390584	0.72	0.4902

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	0.02126657	0.91	0.3454
A8 VS A0 & A5	1	0.07238291	3.09	0.0850
M0 VS M2 MAIN	1	0.02626172	1.12	0.2949
M0 VS M1 MAIN	1	0.00416331	0.18	0.6752
M1 VS M2 MAIN	1	0.04827192	2.06	0.1575

PARAMETER			ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT			0.41872146 B	4.22	0.0001	0.09914119
PHSDTMB			-0.12402469	-0.87	0.3903	0.14310434
A	0		0.01044255 B	0.10	0.9229	0.10738553
	5		0.11197656 B	1.47	0.1465	0.07592167
	8		0.00000000 B	.	.	.
M	0		-0.00605934 B	-0.07	0.9439	0.07148726
	1		0.05189363 B	0.69	0.4903	0.07466900
	2		0.00000000 B	.	.	.
A*M	0	0	0.12291987 B	1.20	0.2359	0.10285330
	0	1	0.05596230 B	0.50	0.6180	0.11153059
	0	2	0.00000000 B	.	.	.
	5	0	0.00000000 B	.	.	.
	5	1	0.00000000 B	.	.	.
	5	2	0.00000000 B	.	.	.
	8	0	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

A	PHSDTMT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	0.44164677	0.03259271	0.0001
5	0.48355339	0.02958728	0.0001
9	NON-EST	.	.

I/J	1	2	3
1	.	0.3454	.
2	0.3454	.	.
3	.	.	.

PROB > |T| HO: LSMEAN(I)=LSMEAN(J)

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

A	M	PHSDTMT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	0	0.68426868	0.05333076	0.0001
0	1	0.47426388	0.06258262	0.0001
0	2	0.36660795	0.05614383	0.0001
5	0	0.44298261	0.04886754	0.0001
5	1	0.51983559	0.05412854	0.0001
5	2	0.44794195	0.05134425	0.0001
8	0	0.35090605	0.05630265	0.0001

I/J	1	2	3	4	5	6	7
1	.	0.9043	0.1286	0.7642	0.6415	0.8293	0.1042
2	0.9043	.	0.1982	0.8870	0.5843	0.9379	0.1463
3	0.1286	0.1982	.	0.1927	0.0505	0.1793	0.8430
4	0.7642	0.8870	0.1927	.	0.4383	0.9439	0.1465
5	0.6415	0.5843	0.0505	0.4383	.	0.4903	0.0355
6	0.8293	0.9379	0.1793	0.9439	0.4903	.	0.1249
7	0.1042	0.1463	0.8430	0.1465	0.0355	0.1249	.

PROB > |T| HO: LSMEAN(I)=LSMEAN(J)

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

DEPENDENT VARIABLE: PHSDTMT

PARAMETER	ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
MARIJUANA 0	0.47357599	12.84	0.0001	0.03687202
MARIJUANA 1	0.49704988	12.02	0.0001	0.04136510
MARIJUANA 2	0.41717490	11.16	0.0001	0.03738034

PCORR (PERIPHERAL DETECTION: NUMBER CORRECT) 19:47 FRIDAY, MAY 3, 1985 11

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
A	3	0 5 8
M	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 56 OBSERVATIONS IN DATA SET CAN BE USED IN THIS ANALYSIS.

DEPENDENT VARIABLE: PCORRT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	186.20119998	26.60017143	2.76	0.0170	0.287136	7.0318
ERROR	48	462.27532240	9.63073588		ROOT MSE		PCORRT MEAN
CORRECTED TOTAL	55	648.47652238			3.10334270		44.13318393

SOURCE	DF	TYPE III SS	F VALUE	PR > F
PCORRR	1	16.83199041	1.75	0.1924
A	2	143.56916053	7.45	0.0015
M	2	29.47203828	1.53	0.2269
A*M	2	5.94229956	0.31	0.7360

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	88.22629276	9.16	0.0040
A8 VS A0 & A5	1	53.64224924	5.57	0.0224
M0 VS M2 MAIN	1	3.34096618	0.35	0.5586
M0 VS M1 MAIN	1	14.18514009	1.47	0.2308
M1 VS M2 MAIN	1	28.47657832	2.96	0.0920

PARAMETER			ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT			39.23000552 B	8.07	0.0001	4.85842061
PCORRR			0.13946969	1.32	0.1924	0.10549742
A	0		-0.41391185 B	-0.19	0.8486	2.15640424
	5		-4.12566658 B	-2.79	0.0076	1.47919309
	8		0.00000000 B	.	.	.
M	0		1.46402714 B	0.99	0.3268	1.47684252
	1		2.62255706 B	1.63	0.1091	1.60615511
	2		0.00000000 B	.	.	.
A*M	0	0	-1.64000155 B	-0.77	0.4455	2.13279198
	0	1	-1.22196237 B	-0.52	0.6036	2.33758483
	0	2	0.00000000 B	.	.	.
	5	0	0.00000000 B	.	.	.
	5	1	0.00000000 B	.	.	.
	5	2	0.00000000 B	.	.	.
	8	0	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO), THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

A	PCORRT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
0	45.2189440	0.6565292	0.0001	1	.	0.0040	.
5	42.4610439	0.6309345	0.0001	2	0.0040	.	.
B	NON-EST	.	.	3	.	.	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

A	M	PCORRT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3	4	5	6	7
0	0	44.6335629	1.0553188	0.0001	1	.	0.3418	0.9105	0.1569	0.5704	0.0263	0.1796
0	1	46.2119320	1.2677321	0.0001	2	0.3418	.	0.4140	0.0273	0.1573	0.0039	0.7779
0	2	44.8113373	1.1228577	0.0001	3	0.9105	0.4140	.	0.1386	0.5027	0.0211	0.2468
5	0	42.5630097	0.9814118	0.0001	4	0.1569	0.0273	0.1386	.	0.4532	0.3268	0.0076
5	1	43.7225396	1.1772627	0.0001	5	0.5704	0.1573	0.5027	0.4532	.	0.1091	0.0744
5	2	41.0999325	1.1026155	0.0001	6	0.0263	0.0039	0.0211	0.3268	0.1091	.	0.0009
B	0	44.6882763	1.1080943	0.0001	7	0.1796	0.7779	0.2468	0.0076	0.0744	0.0009	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

DEPENDENT VARIABLE: PCORRT

PARAMETER	ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
MARIJUANA 0	43.59828428	60.45	0.0001	0.72127446
MARIJUANA 1	44.96723379	52.06	0.0001	0.86371894
MARIJUANA 2	42.05565791	54.03	0.0001	0.79509234

VMVELT (VELOCITY MAINTENANCE: MEAN VELOCITY) 19:48 WEDNESDAY, APRIL 3, 1985 13

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
A	4	0 5 M
M	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL DEPENDENT VARIABLES ARE EXAMINED WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 61 OBSERVATIONS IN DATA SET C ARE USED IN THIS ANALYSIS.

DEPENDENT VARIABLE: VMVELT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	96.01394289	13.71913755	5.42	0.0001	0.417248	1.8942
ERROR	54	134.93557393	2.54595423		ROOT MSE		VMVELT MEAN
CORRECTED TOTAL	61	231.54951671			1.59560466		84.23745738

SOURCE	DF	TYPE III SS	F VALUE	PR > F
VMVELO	1	70.31156141	27.35	0.0001
A	3	5.58374485	1.08	0.3467
M	2	1.26074176	0.25	0.7816
A*M	2	5.45356233	1.96	0.1652

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	5.50371974	2.16	0.1474
AM VS A0 & A5	1	0.00459591	0.00	0.9663
M0 VS M2 MAIN	1	0.05477714	0.02	0.8939
M0 VS M1 MAIN	1	0.75801173	0.30	0.5852
M1 VS M2 MAIN	1	1.11917981	0.44	0.5119

PARAMETER			ESTIMATE		T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT			65.16300221	B	7.64	0.0001	8.53552016
VMVELO			0.43333575		5.28	0.0001	0.08222880
A	0		-1.58201045	B	-1.45	0.1524	1.09248511
	5		-0.11160138	B	-0.16	0.8764	0.71584538
	M		0.00000000	B	.	.	.
M	0		-1.19280548	B	-1.46	0.1513	0.75742297
	1		-1.17999687	B	-1.45	0.1525	0.80661048
	2		0.00000000	B	.	.	.
A*M	0	0	2.04608850	B	1.85	0.0706	1.10797315
	0	1	1.58302208	B	1.40	0.1660	1.12904523
	0	2	0.00000000	B	.	.	.
	5	0	0.00000000	B	.	.	.
	5	1	0.00000000	B	.	.	.
	5	2	0.00000000	B	.	.	.
	M	0	0.00000000	B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

					PROB > |T|		
					HO:LSMEAN=0	1	2	3
1	[illegible]	[illegible]	0.0001	1	.	0.1474	.
2	[illegible]	[illegible]	0.0001	2	0.1474	.	.
3	[illegible]	[illegible]	.	3	.	.	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

A	B	LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0	I/J	1	2	3	4	5	6	7
0	0	[illegible]	[illegible]	0.0001	1	.	0.5051	0.2451	0.8246	0.7604	0.2484	0.9380
0	1	[illegible]	[illegible]	0.0001	2	0.5051	.	0.6069	0.6422	0.7194	0.0740	0.5392
1	0	[illegible]	[illegible]	0.0001	3	0.2451	0.6069	.	0.3129	0.3882	0.0226	0.2491
1	1	[illegible]	[illegible]	0.0001	4	0.8246	0.6422	0.3129	.	0.9299	0.1513	0.8764
2	0	[illegible]	[illegible]	0.0001	5	0.7604	0.7194	0.3882	0.9299	.	0.1525	0.8142
2	1	[illegible]	[illegible]	0.0001	6	0.2484	0.0740	0.0226	0.1513	0.1525	.	0.1964
					7	0.9380	0.5392	0.2491	0.8764	0.8142	0.1964	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

DEPENDENT VARIABLE: [illegible]

SOURCE	[illegible]	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
[illegible]	[illegible]	[illegible]	0.0001	0.37782232
[illegible]	[illegible]	[illegible]	0.0001	0.40106532
[illegible]	[illegible]	[illegible]	0.0001	0.40284804

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
A	4	0 5 8
M	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL INTERCEPT STATISTICS ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 61 OBSERVATIONS IN DATA SET CAN BE USED IN THIS ANALYSIS.

DEPENDENT VARIABLE: V[illegible]

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	3.[illegible]	0.43349545	0.82	0.5737	0.092070	28.5600
ERROR	54	27.[illegible]	0.52655560		ROOT MSE		VMSDVLT MEAN
CORRECTED TOTAL	61	30.[illegible]			0.72564164		2.54076230

SOURCE	DF	TYPE III SS	F VALUE	PR > F
VMSDZEM	3	1.[illegible]	2.21	0.1433
A	2	0.[illegible]	0.22	0.8034
M	2	0.[illegible]	0.60	0.5511
A*M	2	0.[illegible]	0.01	0.5453

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	0.[illegible]	0.34	0.5627
A8 VS A0 & A5	1	0.[illegible]	0.10	0.7558
M0 VS M2 M1	1	0.[illegible]	0.46	0.5027
M0 VS M1 M2	1	0.[illegible]	0.21	0.6515
M1 VS M2 M0	1	0.[illegible]	1.19	0.2804

PARAMETER		ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		1.[illegible] B	2.59	0.0042	0.62083776
VMSDZEM		.[illegible]	1.43	0.1433	0.19425221
A	0	-0.[illegible] B	-0.55	0.5828	0.48678839
	5	-0.[illegible] B	-0.30	0.7616	0.32803212
	8	0.[illegible] B	.	.	.
M	0	-0.[illegible] B	-0.31	0.7568	0.34420249
	1	0.[illegible] B	0.34	0.7385	0.36282090
	2	0.[illegible] B	.	.	.
A*M	0 0	0.[illegible] B	1.11	0.2734	0.49658852
	0 1	0.[illegible] B	0.62	0.5404	0.51335001
	0 2	0.[illegible] B	.	.	.
	5 0	0.[illegible] B	.	.	.
	5 1	0.[illegible] B	.	.	.
	5 2	0.[illegible] B	.	.	.
	8 0	0.[illegible] B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN FOUND TO BE SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATIONS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATIONS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: (BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

[illegible] EFFECTIVE MAINTENANCE: STANDARD DEVIATION VELOCITY) 10:48 WEDNESDAY, APRIL 3, 1985

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

	[illegible]	[illegible]	Pr > |T|	Pr > |T| H0: LSMEAN(I)=LSMEAN(J)			
			H0:LSMEAN=0	I/J	1	2	3
1	[illegible]	[illegible]	0.0001	1	.	1.5627	.
2	[illegible]	[illegible]	0.0001	2	0.5627	.	.
3	[illegible]	.	.	3	.	.	.

NOTE: To ensure [illegible] LEVELS, [illegible] PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

A		[illegible]	[illegible]	Pr > |T|	Pr > |T| H0: LSMEAN(I)=LSMEAN(J)						
				H0:LSMEAN=0	I/J	1	2	3	4	5	6	7
1		[illegible]	[illegible]	0.0001	1	.	0.9904	0.2221	0.2591	0.6690	0.4418	0.4111
2	1	[illegible]	[illegible]	0.0001	2	0.9904	.	0.2331	0.2817	0.6875	0.4634	0.4261
3	2	[illegible]	[illegible]	0.0001	3	0.2221	0.2331	.	0.8597	0.4309	0.6465	0.6401
4	3	[illegible]	[illegible]	0.0001	4	0.2591	0.2817	0.8597	.	0.5089	0.7568	0.7616
5	4	[illegible]	[illegible]	0.0001	5	0.6690	0.6875	0.4309	0.5089	.	0.7385	0.7122
6	5	[illegible]	[illegible]	0.0001	6	0.4418	0.4634	0.6465	0.7568	0.7385	.	0.9837
7	6	[illegible]	[illegible]	0.0001	7	0.4111	0.4261	0.6401	0.7616	0.7122	0.9837	.

NOTE: To ensure [illegible] LEVELS, [illegible] PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

[illegible]

[illegible]	[illegible]	T for H0: [illegible]	Pr > |T|	STD ERROR OF ESTIMATE
[illegible]	[illegible]	[illegible]	0.0001	0.16532704
[illegible]	[illegible]	[illegible]	0.0001	0.18141045
[illegible]	[illegible]	[illegible]	0.0001	0.18159844

[illegible] FOLLOWING PRIMARY: MEAN VELOCITY) 19:59 WEDNESDAY, APRIL 3, 1985 1

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
[illegible]	3	[illegible] S M
[illegible]	3	[illegible] 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL DEPENDENT VARIABLES ARE EXAMINED FOR MISSING VALUES WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 60 OBSERVATIONS CAN BE USED IN THIS ANALYSIS.

[illegible] DEPENDENT VARIABLE: [illegible]

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
[illegible]	[illegible]	[illegible]	[illegible]	2.09	0.0607	0.219556	9.4317
[illegible]	[illegible]	[illegible]	[illegible]		ROOT MSE		CFRVELT MEAN
CORRECTED TOTAL	[illegible]	[illegible]			2.84975319		30.21471167

SOURCE	DF	TYPE III SS	F VALUE	PR > F
[illegible]	1	[illegible]	10.36	0.0019
A	2	[illegible]	0.20	0.8190
B	2	[illegible]	0.65	0.5231
A*B	4	[illegible]	0.07	0.9913

CONTRAST	DF	SS	F VALUE	PR > F
[illegible] VS SS	1	[illegible]	0.04	0.8471
AS VS AM + AL	1	[illegible]	0.36	0.5523
SM VS AM + AL	1	[illegible]	1.18	0.2816
MO VS AL + AM	1	[illegible]	0.08	0.7713
MI VS [illegible]	1	[illegible]	0.08	0.7760

PARAMETER			ESTIMATE	T FOR H0: PARAMETER=0	PR > [illegible]	STD ERROR OF ESTIMATE
INTERCEPT			[illegible] B	0.83	0.4081	2.69009758
[illegible]			[illegible]	3.30	0.0018	0.04854409
A	0		[illegible] B	-0.12	0.9016	1.95050404
	1		[illegible] B	-0.50	0.5543	1.27568813
	2		0.00000000 B	.	.	.
M	0		[illegible] B	0.48	0.3817	1.40575448
	1		[illegible] B	0.45	0.6564	1.47556274
	2		0.00000000 B	.	.	.
A*M	0	0	[illegible] B	-0.17	0.8679	1.98547847
	0	1	[illegible] B	-0.36	0.7191	2.05205034
	0	2	0.00000000 B	.	.	.
	1	0	0.00000000 B	.	.	.
	1	1	0.00000000 B	.	.	.
	1	2	0.00000000 B	.	.	.
	2	0	0.00000000 B	.	.	.
	2	1	0.00000000 B	.	.	.
	2	2	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN FOUND TO BE SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (ON ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: BIASED ESTIMATOR = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

LEAST SQUARES MEANS

				0.0001	1	.	0.8477	.		
				0.0001	2	0.8477	.	.		
					3	.	.	.		

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

0	0			0.0001	1	.	0.4796	0.5177	0.8405	0.5871	0.3288	0.6449
0	1			0.0001	2	0.4796	.	0.9541	0.5536	0.8744	0.7703	0.2522
0	2			0.0001	3	0.5177	0.9541	.	0.5943	0.9199	0.7282	0.2777
0	3			0.0001	4	0.8405	0.5536	0.5943	.	0.6693	0.3817	0.5549
1	0			0.0001	5	0.5871	0.8744	0.9199	0.6693	.	0.4568	0.3267
1	2			0.0001	6	0.3288	0.7703	0.7282	0.3817	0.6568	.	0.1607
1	3			0.0001	7	0.6449	0.2522	0.2777	0.5549	0.3267	0.1607	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

NOTE: SAS HAS OMITTED 60 OBSERVATIONS FROM THIS ANALYSIS DUE TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 60 OBSERVATIONS HAVE BEEN USED IN THIS ANALYSIS.

SOURCE	DF	SUM OF SQUARES	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	0.[illegible]	1.42	0.1827	0.104784	37.4081
ERROR	55	0.[illegible]		ROOT MSE		CFRSDVLT MEAN
CORRECTED TOTAL	59	0.[illegible]		1.06705901		2.85308833

SOURCE	DF	TYPE III SS	F VALUE	PR > F
CFRSDVLT	1	0.[illegible]	5.00	0.0287
S	2	0.[illegible]	2.10	0.1324
M	2	0.[illegible]	1.40	0.1749
S*M	2	0.[illegible]	0.25	0.7807

CONTRAST	DF	SS	F VALUE	PR > F
AB VS AS	1	2.[illegible]	2.00	0.1630
AF VS AB & AS	1	3.[illegible]	2.80	0.1004
MB VS MF MAIN	1	0.[illegible]	0.04	0.8400
MB VS MI MAIN	1	2.[illegible]	2.50	0.1197
MI VS MF MAIN	1	2.[illegible]	2.41	0.0940

PARAMETER		ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		1.[illegible] B	6.74	0.0094	0.65784233
CFRSDVLM		0.[illegible] B	6.00	0.0503	0.08578813
M	B	1.[illegible] B	1.43	0.1566	0.73777780
	S	0.[illegible] B	0.89	0.3783	0.48275467
	M	0.[illegible] B	.	.	.
S	0	-0.[illegible] B	-1.07	0.9482	0.53720724
	1	-0.[illegible] B	-0.73	0.4659	0.55344191
	2	0.[illegible] B	.	.	.
A*F	0 0	-0.[illegible] B	-0.11	0.9135	0.74643871
	0 1	-0.[illegible] B	-0.64	0.5221	0.77076150
	0 2	0.[illegible] B	.	.	.
	1 0	0.[illegible] B	.	.	.
	1 1	0.[illegible] B	.	.	.
	1 2	0.[illegible] B	.	.	.
	2 0	0.[illegible] B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN FOUND SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND TO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR MAY BE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: BIASED ESTIMATOR = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

[illegible] LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

	[illegible]	STD ERROR OF LSMEAN	PR > |T| H0: LSMEAN=0	PR > |T| H0: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	[illegible]	[illegible]	0.0001	1	.	0.1630	.
2	[illegible]	[illegible]	0.0001	2	0.1630	.	.
3	[illegible]	.	.	3	.	.	.

NOTE: TO ENSURE OVERALL PROBABILITY LEVELS, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

[illegible]	[illegible]	[illegible]	STD ERROR OF LSMEAN	PR > |T| H0: LSMEAN=0	PROB > |T| H0: LSMEAN(I)=LSMEAN(J) I/J	1	2	3	4	5	6	7
1	0	[illegible]	[illegible]	0.0001	1	.	0.1359	0.8232	0.2790	0.0839	0.3509	0.0529
1	1	[illegible]	[illegible]	0.0001	2	0.1359	.	0.0970	0.6384	0.8130	0.6150	0.7173
1	2	[illegible]	[illegible]	0.0001	3	0.8232	0.0970	.	0.2036	0.0589	0.2648	0.0363
2	0	[illegible]	[illegible]	0.0001	4	0.2790	0.6384	0.2036	.	0.4709	0.9482	0.3783
2	1	[illegible]	[illegible]	0.0001	5	0.0839	0.8130	0.0589	0.4709	.	0.4659	0.9099
2	2	[illegible]	[illegible]	0.0001	6	0.3509	0.6150	0.2648	0.9482	0.4659	.	0.3827
3	0	[illegible]	[illegible]	0.0001	7	0.0529	0.7173	0.0363	0.3783	0.9099	0.3827	.

NOTE: TO ENSURE OVERALL PROBABILITY LEVELS, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

[illegible] VARIABLE: [illegible]

[illegible]	[illegible]	[illegible]	PR > |T|	STD ERROR OF ESTIMATE
[illegible]	[illegible]	12.55	0.0001	0.24733081
[illegible]	[illegible]	[illegible]	0.0001	0.26745115
[illegible]	[illegible]	11.52	0.0001	0.27705778

[illegible] 19:59 WEDNESDAY, APRIL 3, 1985 9

[illegible]

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
[illegible]	3	[illegible]
	3	[illegible]

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: [illegible] OBSERVATIONS IN DATA SET WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES, HOWEVER, ONLY 56 OBSERVATIONS IN DATA SET WERE USED IN THIS ANALYSIS.

[illegible]

[illegible]	DF	[illegible]	F VALUE	PR > F	R-SQUARE	C.V.
[illegible]	[illegible]	[illegible]	2.67	0.0205	0.279918	6.4756
[illegible]	[illegible]	[illegible]		ROOT MSE		CFORVELT MEAN
[illegible]	[illegible]	[illegible]		2.97195910		45.8928 7321

[illegible]	DF	TYPE III SS	F VALUE	PR > F
[illegible]	1	[illegible]	5.25	0.0118
A	2	[illegible]	2.63	0.0825
B	2	[illegible]	0.87	0.6241
A*B	2	21.71[illegible]	1.23	0.3015

CONTRAST	DF	SS	F VALUE	PR > F
A1 VS A3	1	[illegible]	5.25	0.0263
A2 VS A1 & A3	1	[illegible]	0.00	0.9662
B1 VS B2 & B3	1	[illegible]	0.90	0.3462
B2 VS B1 & B3	1	[illegible]	0.35	0.5573
B1 VS B2 & B3	1	[illegible]	0.11	0.7423

PARAMETER		ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		[illegible]	3.11	0.0001	4.44096152
CROWDING		[illegible]	2.42	0.0118	0.08190282
A	1	[illegible]	-1.14	0.2434	2.11585483
	2	[illegible]	0.79	0.4341	1.37142524
	3	[illegible]	.	.	.
B	1	[illegible]	0.29	0.7860	1.51006401
	2	[illegible]	-0.85	0.3978	1.59845609
	3	[illegible]	.	.	.
A*B	1 1	[illegible]	0.59	0.5648	2.14524164
	1 2	[illegible]	1.56	0.1294	2.24070164
	1 3	[illegible]	.	.	.
	2 1	[illegible]	.	.	.
	2 2	[illegible]	.	.	.
	2 3	[illegible]	.	.	.
	3 1	[illegible]	.	.	.
	3 2	[illegible]	.	.	.
	3 3	[illegible]	.	.	.

NOTE: THE X'X MATRIX HAS BEEN FOUND TO BE SINGULAR AND A GENERALIZED INVERSE WAS USED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES ARE BASED ON ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: EXPECTED ESTIMATE = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

... LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

			PROB > |T| HO: LSMEAN(I)=LSMEAN(J)			
				I/J	1	2	3
1	...	...	0.0001	1	.	0.0263	.
2	...	...	0.0001	2	0.0263	.	.
3	...	...	.	3	.	.	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

				PROB > |T| HO: LSMEAN(I)=LSMEAN(J)							
				I/J	1	2	3	4	5	6	7
0	0	...	...	1	.	0.7599	0.2927	0.1056	0.7005	0.2143	0.3898
0	1	...	...	2	0.7599	.	0.1834	0.2140	0.9384	0.3571	0.6053
0	2	...	...	3	0.2927	0.1834	.	0.0072	0.1598	0.0282	0.0532
1	0	...	...	4	0.1056	0.2140	0.0072	.	0.2455	0.8040	0.4341
1	1	...	...	5	0.7005	0.9384	0.1598	0.2455	.	0.3976	0.6631
1	2	...	...	6	0.2143	0.3571	0.0282	0.8040	0.3976	.	0.6441
2	2	...	...	7	0.3898	0.6053	0.0532	0.4341	0.6631	0.6441	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

DEP VARIABLE: ...

SOURCE	DF	SUM OF SQUARES	PR > F	STD ERROR OF ESTIMATE
MODEL	...	...	0.0001	0.70841752
ERROR	...	...	0.0001	0.79714419
CORRECTED TOTAL	...	...	0.0001	0.77049262

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GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
[illegible]	3	0 5 M
[illegible]	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL DEPENDENT VARIABLES ARE CONSIDERED WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 55 OBSERVATIONS IN THE DATA SET [illegible] THIS ANALYSIS.

DEPENDENT VARIABLE: [illegible]

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	[illegible]	0.57011650	1.15	0.3485	0.146348	19.5055
ERROR	47	[illegible]	0.49216343		ROOT MSE		CFORSDVT MEAN
CORRECTED TOTAL	54	[illegible]			0.76299669		3.91170909

SOURCE	DF	TYPE III SS	F VALUE	PR > F
CFORSDVS	1	[illegible]	2.49	0.1210
A	2	[illegible]	1.53	0.2268
M	2	[illegible]	0.56	0.5731
A*M	2	[illegible]	0.32	0.7303

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	[illegible]	2.38	0.1294
A0 VS A0 & A5	1	[illegible]	0.49	0.4867
A5 VS A2 MAIN	1	[illegible]	0.04	0.8421
M0 VS M1 MAIN	1	[illegible]	1.11	0.2944
M1 VS M2 MAIN	1	[illegible]	0.66	0.4199

PARAMETER			ESTIMATE	T FOR H0: PARAMETER=0	PR > ITI	STD ERROR OF ESTIMATE
INTERCEPT			[illegible] B	4.43	0.0001	0.76596088
CFORSDVS			[illegible]	1.58	0.1210	0.14395143
A	0		-0.86[illegible]45C B	-1.54	0.2865	0.56110606
	1		-0.02[illegible]202 B	-0.07	0.9445	0.35115581
	2		0.00[illegible]000 B	.	.	.
M	0		-0.02[illegible]055 B	-0.08	0.9379	0.38039287
	1		-0.40[illegible]189 B	-1.13	0.2633	0.40911488
	2		0.00[illegible]000 B	.	.	.
A*M	0	0	[illegible] B	0.31	0.7549	0.54738255
	0	1	0.45[illegible]442 B	0.76	0.4365	0.59206683
	0	2	0.00[illegible]000 B	.	.	.
	1	0	0.00[illegible]000 B	.	.	.
	1	1	0.00[illegible]000 B	.	.	.
	1	2	0.00[illegible]000 B	.	.	.
	2	0	0.00[illegible]000 B	.	.	.
	2	1	0.00[illegible]000 B	.	.	.
	2	2	0.00[illegible]000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DETECTED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE A-CUBE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (SEE SPECIAL FUNCTIONS). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: (BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

[illegible] FOLLOWING OPEN ROAD: STANDARD DEVIATION VELOCITY)

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GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

[illegible]	LSMEAN	STD ERR OF LSMEAN	PR > |T| H0: LSMEAN=0	PR > |T| H0: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
[illegible]	3.0000[illegible]	0.[illegible]	0.0001	1	.	0.1298	.
[illegible]	3.[illegible]	0.[illegible]	0.0001	2	0.1298	.	.
[illegible]	[illegible]	.	.	3	.	.	.

NOTE: To [illegible] overall significance levels only [illegible] ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

A		[illegible] LSMEAN	STD ERR OF LSMEAN	PR > |T| H0: LSMEAN=0	PR > |T| H0: LSMEAN(I)=LSMEAN(J) I/J	1	2	3	4	5	6	7
0	0	3.7[illegible]	0.[illegible]	0.0001	1	.	0.7155	0.7249	0.2879	0.9113	0.2978	0.2704
0	1	3.6[illegible]	0.[illegible]	0.0001	2	0.7155	.	0.9877	0.1670	0.8045	0.1724	0.1546
0	2	3.[illegible]	0.[illegible]	0.0001	3	0.7249	0.9877	.	0.1665	0.8157	0.1791	0.1566
5	0	4.[illegible]	0.[illegible]	0.0001	4	0.2879	0.1670	0.1665	.	0.2559	0.9379	0.9445
5	1	4.[illegible]	0.[illegible]	0.0001	5	0.9113	0.8045	0.8157	0.2559	.	0.2633	0.2397
5	2	4.[illegible]	0.[illegible]	0.0001	6	0.2978	0.1724	0.1791	0.9379	0.2633	.	0.9893
5	0	4.[illegible]	0.[illegible]	0.0001	7	0.2704	0.1546	0.1566	0.9445	0.2397	0.9893	.

NOTE: To [illegible] overall significance levels only [illegible] ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

[illegible]: [illegible]

[illegible]	[illegible]	[illegible]	PR > |T|	STD ERROR OF ESTIMATE
[illegible]	[illegible]	21.[illegible]	0.0001	0.1[illegible]
[illegible]	[illegible]	17.[illegible]	0.0001	0.2[illegible]
[illegible]	[illegible]	1[illegible]	0.0001	0.2[illegible]

[illegible] (CURVE FOLLOWING OPEN ROAD: MEAN MAXIMUM BRAKE PRESSURE)

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
[illegible]	3	0 5 M
[illegible]	3	0 1 2

[illegible] OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL [illegible] ARE CONSIDERED AS CLASSIFIED WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 59 OBSERVATIONS IN THIS DATA SET CAN BE USED IN THIS ANALYSIS.

[illegible] MODEL: [illegible]

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	27.[illegible]	3.85708730	2.76	0.0165	0.274523	21.9339
ERROR	51	71.[illegible]	1.39437574		ROOT MSE		CORRECT MEAN
CORRECTED TOTAL	58	98.[illegible]			1.18295213		5.39326780

SOURCE	DF	Type III SS	F VALUE	PR > F
[illegible]	1	19.21[illegible]	13.42	0.0007
A	2	0.2[illegible]	0.11	0.8909
[illegible]	2	2.[illegible]	0.74	0.4771
A*[illegible]	2	3.25[illegible]	1.16	0.3210

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	0.20921792	0.15	0.7006
A0 VS A2 A5	1	0.[illegible]	0.05	0.8272
[illegible]	1	0.[illegible]	0.45	0.5039
M0 VS M1 M2	1	0.[illegible]	0.24	0.6213
M1 VS M2	1	2.[illegible]	1.65	0.2343

PARAMETER		ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		4.[illegible] B	4.50	0.0001	0.78010747
[illegible]		0.37[illegible]	3.41	0.0007	0.10335314
A	0	-0.[illegible] B	-0.07	0.9448	0.83951499
	5	-0.[illegible] B	-0.17	0.8661	0.56321096
	M	0.[illegible] B	.	.	.
M	0	-0.46[illegible] B	-0.81	0.4208	0.57188904
	1	-0.06[illegible] B	-0.11	0.9147	0.50172347
	2	0.[illegible] B	.	.	.
A*M	0 0	0.[illegible] B	0.65	0.5517	0.82009146
	0 1	-0.[illegible] B	-1.04	0.3023	0.84739316
	0 2	0.[illegible] B	.	.	.
	5 0	0.[illegible] B	.	.	.
	5 1	0.[illegible] B	.	.	.
	5 2	0.[illegible] B	.	.	.
	M 0	0.[illegible] B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN FOUND SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: (BIASED) ESTIMATE(S) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

20:40 WEDNESDAY, APRIL 3, 1985

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

[illegible]	[illegible]	[illegible]	Pr > |T| H0: LSMEAN(i)=LSMEAN(j)			
			i/j	1	2	3
[illegible]	[illegible]	0.0001	1	.	0.7006	.
[illegible]	[illegible]	0.0031	2	0.7006	.	.
[illegible]	[illegible]	.	3	.	.	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

A	i	[illegible]	Std Err	Prob > |T|	Prob > |T| H0: LSMEAN(i)=LSMEAN(j)							
				H0:LSMEAN=0	i/j	1	2	3	4	5	6	7
0	1	[illegible]	[illegible]	0.0001	1	.	0.1554	0.8774	0.4799	0.9870	0.9270	0.5951
0	1	[illegible]	[illegible]	0.0001	2	0.1554	.	0.1157	0.4412	0.1733	0.1249	0.3497
0	2	[illegible]	[illegible]	0.0001	3	0.8774	0.1157	.	0.3874	0.8690	0.9502	0.4888
5	0	[illegible]	[illegible]	0.3861	4	0.4799	0.4412	0.3874	.	0.5071	0.4208	0.8661
5	1	[illegible]	[illegible]	0.0001	5	0.9870	0.1733	0.8690	0.5071	.	0.9147	0.6098
5	2	[illegible]	[illegible]	0.0001	6	0.9270	0.1249	0.9502	0.4208	0.9147	.	0.5009
8	0	[illegible]	[illegible]	0.0001	7	0.5951	0.3497	0.4888	0.8661	0.6098	0.5009	.

NOTE: To ensure overall protection level, only probabilities associated with pre-planned comparisons should be used.

DEPENDENT VARIABLE: [illegible]

Parameter	Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
[illegible] 0	[illegible]	19.39	0.0001	0.29388145
[illegible] 1	[illegible]	12.28	0.0001	0.30642625
[illegible] 2	[illegible]	14.76	0.0001	0.29745811

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
[illegible]	3	[illegible]
[illegible]	3	[illegible]

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES, HOWEVER, ONLY 58 OBSERVATIONS IN DATA SET CAN BE USED IN THIS ANALYSIS.

DEPENDENT VARIABLE: [illegible]

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	[illegible]	[illegible]	[illegible]	5.59	0.0001	0.438814	16.6272
ERROR	[illegible]	[illegible]	0.00015131		ROOT MSE		CFACCT MEAN
CORRECTED TOTAL	[illegible]	[illegible]			0.01230099		0.07398103

SOURCE	DF	TYPE III SS	F VALUE	PR > F
[illegible]	1	[illegible]	33.57	0.0001
[illegible]	[illegible]	[illegible]	0.32	0.6044
[illegible]	[illegible]	[illegible]	0.23	0.7731
[illegible]	[illegible]	[illegible]	0.03	0.9570

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	0.00000420	0.02	0.8838
A5 VS A8 & A5	[illegible]	0.00019552	1.25	0.2584
A8 VS A2 [illegible]	[illegible]	0.00005845	0.45	0.5046
M0 VS M1 MAIN	1	0.00000720	0.05	0.8282
M1 VS M2 MAIN	1	0.00002471	0.19	0.6556

PARAMETER		ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		0.02743177 B	2.26	0.0285	0.01220565
[illegible]		0.00532050	5.79	0.0001	0.10370343
A	0	-0.00332845 B	-1.11	0.3151	0.00841513
	5	-0.00232292 B	-0.77	0.4446	0.00583045
	8	0.00000000 B	.	.	.
M	0	0.00263646 B	0.35	0.7274	0.00588673
	1	0.00203301 B	0.33	0.7454	0.00630499
	2	0.00000000 B	.	.	.
A*M	0 0	0.00101573 B	0.19	0.8498	0.00848878
	0 1	0.00221724 B	0.25	0.8061	0.00880403
	0 2	0.00000000 B	.	.	.
	5 0	0.00000000 B	.	.	.
	5 1	0.00000000 B	.	.	.
	5 2	0.00000000 B	.	.	.
	8 0	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN FOUND SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: ESTIMATED ESTIMATOR = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

[illegible] (CURVE FOLLOWING OPEN ROAD: MEAN MAXIMUM ACCELERATION)

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

	LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	0.07197720	0.00251134	0.0001	1	.	0.4338	.
2	0.07422053	0.00247367	0.0001	2	0.4338	.	.
3	0.07251	.	.	3	.	.	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

A	B	LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3	4	5	6	7
0	0	0.07232466	0.00435232	0.0001	1	.	0.9132	0.5527	0.6862	0.8515	0.9518	0.2535
0	1	0.07225538	0.00434907	0.0001	2	0.9132	.	0.6273	0.6065	0.7705	0.8632	0.2099
0	2	0.06943835	0.00434427	0.0001	3	0.5527	0.6273	.	0.3128	0.4487	0.5037	0.0823
1	0	0.07125471	0.00411084	0.0001	4	0.6862	0.6065	0.3128	.	0.8435	0.7274	0.4446
1	1	0.07172494	0.00427872	0.0001	5	0.8515	0.7705	0.4487	0.8435	.	0.8954	0.3637
1	2	0.07326507	0.00415079	0.0001	6	0.9518	0.8632	0.5037	0.7274	0.8954	.	0.2647
2	0	0.07335165	0.00410726	0.0001	7	0.2535	0.2099	0.0823	0.4446	0.3637	0.2647	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

DEP VARIABLE: [illegible]

PARAMETER	ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
[illegible]	[illegible]	24.70	0.0001	0.00300176
[illegible]	[illegible]	22.52	0.0001	0.00314272
[illegible]	[illegible]	23.54	0.0001	0.00300837

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
A	3	1 5 8
M	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL DEPENDENT VARIABLES ARE CONSIDERED WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 56 OBSERVATIONS IN DATA SET CAN BE USED IN THIS ANALYSIS.

DEPENDENT VARIABLE: DRVELT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	466.[illegible]474	66.25754411	3.12	0.0084	0.313041	21.6782
ERROR	48	1023.[illegible]7236	22.16624901		ROOT MSE		DRVELT MEAN
CORRECTED TOTAL	55	1489.[illegible]7109			4.70789645		21.71714286

SOURCE	DF	TYPE III SS	F VALUE	PR > F
DRVELM	1	366.[illegible]2040	16.50	0.0002
A	2	24.[illegible]1960	0.55	0.5836
M	2	23.[illegible]3145	0.52	0.5966
A*M	2	94.[illegible]7492	2.13	0.1304

CONTRAST	DF	SS	F VALUE	PR > F
A6 VS A5	1	2.20157634	0.10	0.7560
AB VS A0 & A5	1	21.77122225	0.95	0.3266
M0 VS M2 MATH	1	23.[illegible]2240	1.07	0.3069
M0 VS M1 MATH	1	6.51[illegible]1948	0.29	0.5903
M1 VS M2 MATH	1	4.3904[illegible]851	0.20	0.6584

PARAMETER			ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT			6.77504116 B	1.74	0.0813	3.89560872
DRVELM			0.51000192	4.07	0.0002	0.12701982
A		0	4.24732264 B	1.31	0.1955	3.23535422
		5	6.03315158 B	1.82	0.0754	2.21932427
		8	0.00000000 B	.	.	.
M		0	3.90389171 B	1.69	0.0966	2.30353999
		1	-0.45024309 B	-0.19	0.8526	2.45291070
		2	0.00000000 B	.	.	.
A*M	0	0	-4.41417742 B	-1.34	0.1881	3.30611126
	0	1	2.46003491 B	0.71	0.4790	3.44883963
	0	2	0.00000000 B	.	.	.
	5	0	0.00000000 B	.	.	.
	5	1	0.00000000 B	.	.	.
	5	2	0.00000000 B	.	.	.
	8	0	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DECLARED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

	MODEL LSMEAN	STD ERROR LSMEAN	PR > |T| HO:LSMEAN=0	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	21.[illegible]	[illegible]	0.0001	1	.	0.7560	.
2	22.[illegible]	[illegible]	0.0001	2	0.7560	.	.
3	[illegible]	.	.	3	.	.	.

NOTE: TO ENSURE OVERALL [illegible] LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

A	B	MODEL LSMEAN	STD ERROR LSMEAN	PR > |T| HO:LSMEAN=0	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3	4	5	6	7
0	0	21.[illegible]	[illegible]	0.0001	1	.	0.3103	0.8295	0.0760	0.9478	0.9005	0.9429
0	1	21.[illegible]	[illegible]	0.0001	2	0.3103	.	0.4159	0.4808	0.2936	0.3687	0.3291
0	2	21.[illegible]	[illegible]	0.0001	3	0.8295	0.4159	.	0.1152	0.7848	0.9279	0.8819
1	0	22.[illegible]	[illegible]	0.0001	4	0.0760	0.4808	0.1152	.	0.0722	0.0966	0.0754
1	1	22.[illegible]	[illegible]	0.0001	5	0.9478	0.2936	0.7848	0.0722	.	0.8526	0.8903
1	2	22.[illegible]	[illegible]	0.0001	6	0.9005	0.3687	0.9279	0.0966	0.8526	.	0.9555
2	0	22.[illegible]	[illegible]	0.0001	7	0.9429	0.3291	0.8819	0.0754	0.8903	0.9555	.

NOTE: TO ENSURE OVERALL [illegible] LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

DEPENDENT VARIABLE: [illegible]

PARAMETER	ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
[illegible]	22.[illegible]	19.04	0.0001	1.14476486
[illegible]	21.[illegible]	17.27	0.0001	1.26157352
[illegible]	21.[illegible]	17.77	0.0001	1.18296449

LOWAY (LEAD CAR FOLLOWING) MEAN HEADWAY 20:40 WEDNESDAY, APRIL 3, 1985 13

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
A	4	0 5 A B
M	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL DEPENDENT VARIABLES ARE EXAMINED WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 45 OBSERVATIONS IN DATA SET CAN BE USED IN THIS ANALYSIS.

DEPENDENT VARIABLE: LOWAYT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	3017.6915[illegible]21	431[illegible].[illegible]3[illegible]89	9.89	0.0001	0.651751	20.0092
ERROR	37	1613.[illegible]3[illegible]0000	43[illegible].[illegible]7[illegible]9[illegible]		ROOT MSE		LOWAYT MEAN
CORRECTED TOTAL	44	4631.[illegible]1[illegible]9[illegible]19			22.03359865		110.11720222

SOURCE	DF	TYPE III SS	F VALUE	PR > F
LEAD CAR	1	1[illegible]1[illegible].[illegible]3[illegible]8[illegible]2	63.00	0.0001
A	3	[illegible]2.3[illegible]1[illegible]1	1.38	0.[illegible]1
M	2	2215.20[illegible]3[illegible]6	2.15	0.1097
A*M	2	1332.17[illegible]1[illegible]5	1.37	0.2662

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	28.63[illegible]2[illegible]20	0.65	0.4151
A1 VS A0 & A5	1	31[illegible].2[illegible]51	0.56	0.4233
M1 VS M2 MAIN	1	2[illegible].[illegible]3[illegible]29	4.62	0.0424
M1 VS M1 MAIN	1	[illegible]7.[illegible]2[illegible]79	3.43	0.5171
M1 VS M2 A*M	1	1[illegible].13[illegible]2	2.07	0.1586

PARAMETER			ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT			50.0[illegible]7[illegible]21 B	2.89	0.0064	17.31642052
LEAD CAR			0.[illegible]7[illegible]3	7.94	0.0001	0.10272473
A	0		-29.4[illegible]3[illegible]3 B	-1.77	0.0844	16.62[illegible]5[illegible]9
	5		-15.[illegible]4[illegible]34 B	-1.36	0.1754	11.61[illegible]6[illegible]8
	A		0.[illegible]0[illegible]0 B	.	.	.
M	0		-23.[illegible]3[illegible]2[illegible]8 B	-2.80	0.0080	12.11535[illegible]4
	1		-21.12[illegible]3[illegible]99 B	-1.63	0.1117	12.96469[illegible]4
	2		0.00[illegible]0000 B	.	.	.
A*M	0	0	29.[illegible]3[illegible]1[illegible] B	1.65	0.1081	17.89[illegible]6[illegible]1
	0	1	16.14[illegible]3[illegible]4 B	0.89	0.3802	18.19554614
	0	2	0.00[illegible]0000 B	.	.	.
	5	0	0.00[illegible]0000 B	.	.	.
	5	1	0.00[illegible]0000 B	.	.	.
	5	2	0.0[illegible]0[illegible]000 B	.	.	.
	A	0	0.00[illegible]0000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN FOUND TO BE SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: EXPECTED ESTIMATOR = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

	[illegible]	STD ERR	PROB > |T|	PROB > |T| HO: LSMEAN(I)=LSMEAN(J)			
	LSMEAN	OF LSMEAN	HO:LSMEAN=0	I/J	1	2	3
1	[illegible]	0.4150421	0.0001	1	.	0.8161	.
2	[illegible]	0.1000626	0.0001	2	0.8161	.	.
3	[illegible]	.	.	3	.	.	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

A	B	[illegible] LSMEAN	STD ERR OF LSMEAN	PROB > |T| HO:LSMEAN=0	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3	4	5	6	7
0	0	[illegible]	0.[illegible]	0.0001	1	.	0.9721	0.7401	0.2379	0.8209	0.1651	0.9986
0	1	[illegible]	0.[illegible]	0.0001	2	0.9721	.	0.6988	0.2377	0.8442	0.1305	0.9668
0	2	[illegible]	0.[illegible]	0.0001	3	0.7401	0.6988	.	0.1209	0.5787	0.2661	0.7068
5	0	[illegible]	0.[illegible]	0.0001	4	0.2379	0.2377	0.1209	.	0.3437	0.0080	0.1754
5	1	[illegible]	0.[illegible]	0.0001	5	0.8209	0.8442	0.5787	0.3437	.	0.1117	0.7957
5	2	[illegible]	0.[illegible]	0.0001	6	0.1651	0.1305	0.2661	0.0080	0.1117	.	0.1087
8	6	[illegible]	0.[illegible]	0.0001	7	0.9986	0.9668	0.7068	0.1754	0.7957	0.1087	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

DEPENDENT VARIABLE: [illegible]

SOURCE	DF	[illegible] SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.	ROOT MSE	[illegible] MEAN
MODEL	[illegible]	[illegible]	[illegible]	[illegible]	0.0001	0.[illegible]	[illegible]	0.[illegible]	[illegible]
ERROR	[illegible]	[illegible]	[illegible]						
CORRECTED TOTAL	[illegible]	[illegible]							

SOURCE	TYPE III SS	F VALUE	PR > F
[illegible]	[illegible]	[illegible]	0.0001
[illegible]	[illegible]	[illegible]	0.0001
[illegible]	[illegible]	[illegible]	0.0001

SOURCE	TYPE III SS	F VALUE	PR > F	STD ERROR OF ESTIMATE
[illegible]	[illegible]	15.[illegible]	0.0001	0.70955333
[illegible]	[illegible]	16.[illegible]	0.0001	0.57764967
[illegible]	[illegible]	14.[illegible]	0.0001	0.07306296

[illegible] FOLLOWING) STANDARD DEVIATION HEADWAY) 21109 WEDNESDAY, APRIL 3, 1985 1

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
A	6	0 5 6
M	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL DEPENDENT VARIABLES ARE EXAMINED WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES, HOWEVER, ONLY 45 OBSERVATIONS IN DATA SET WILL BE USED IN THIS ANALYSIS.

[illegible] DEPENDENT VARIABLE: [illegible]

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	[illegible]	326.1768[illegible]	3.68	0.0041	0.410569	36.4369
ERROR	36	[illegible]	[illegible]		ROOT MSE		LCSDHDT MEAN
CORRECTED TOTAL	44	[illegible]			9.3837[illegible]		25.7533[illegible]

SOURCE	DF	TYPE III SS	F VALUE	PR > F
LCSDHDT	1	[illegible]	11.56	0.0002
A	2	[illegible]	[illegible]	0.[illegible]
M	2	[illegible]	2.81	0.0731
A*M	2	[illegible]	0.49	0.[illegible]

LCMI=ASI	DF	SS	F VALUE	PR > F
AU VS AS	1	72.[illegible]	0.83	0.3647
AE VS AU & AS	1	0.[illegible]	0.00	0.9494
MO VS NE MAIN	1	276.[illegible]	3.13	0.0[illegible]
MO VS MI MAIN	1	11.[illegible]	0.13	0.7217
MI VS NE MAI.	1	392.[illegible]	4.46	0.0415

PARAMETER			ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT			17.[illegible] B	2.49	0.0173	7.20661351
LCSDHDT			0.[illegible]	4.20	0.0002	0.1[illegible]
A		6	-7.[illegible] B	-1.14	0.3039	7.13925771
		5	-0.[illegible] B	-0.11	0.9109	4.99409220
		0	0.00000000 B	.	.	.
M		0	-10.[illegible] B	-2.19	0.0434	5.08756606
		1	-10.[illegible] B	-1.86	0.0703	5.66496328
		2	0.00000000 B	.	.	.
A*M	0	0	7.[illegible] B	0.97	0.3361	7.65784398
	0	1	4.41[illegible] B	0.57	0.5740	7.77601914
	0	2	0.00000000 B	.	.	.
	5	0	0.00000000 B	.	.	.
	5	1	0.00000000 B	.	.	.
	5	2	0.00000000 B	.	.	.
	M	0	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED, AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATIONS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

A	LSMEAN	STD ERR LSMEAN	PROB > |T| H0:LSMEAN=0	PROB > |T| H0: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
0	29.1744819	2.[illegible]	0.0001	1	.	0.3687	.
1	27.0073302	2.2044651	0.0001	2	0.3687	.	.
2	[illegible]	.	.	3	.	.	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

A	X	LSMEAN	STD ERR LSMEAN	PROB > |T| H0:LSMEAN=0	PROB > |T| H0: LSMEAN(I)=LSMEAN(J) I/J	1	2	3	4	5	6	7
0	0	29.0744819	4.2183526	0.0001	1	.	0.6095	0.5985	0.9194	0.9342	0.0723	0.9970
0	1	31.1039945	3.4711225	0.0001	2	0.6095	.	0.2644	0.6629	0.6919	0.0143	0.5634
0	2	27.2511304	3.9219583	0.0001	3	0.5985	0.2644	.	0.4961	0.5489	0.1834	0.5368
1	0	29.4927430	4.0322092	0.0001	4	0.9194	0.6629	0.4961	.	0.9888	0.0434	0.9109
1	1	25.5754708	4.3470113	0.0001	5	0.9342	0.6919	0.5489	0.9888	.	0.0703	0.9284
1	2	34.1338369	3.3427459	0.0001	6	0.0723	0.0143	0.1834	0.0434	0.0703	.	0.0379
2	0	24.0565471	3.1703981	0.0001	7	0.9970	0.5634	0.5368	0.9109	0.9284	0.0379	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

0 1 0 1 0 2 1

DEPENDENT VARIABLE: LSMEAN

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

DRVFLT (TIME & ROAD: MEAN VELOCITY) 21:09 WEDNESDAY, APRIL 3, 1985 5

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
A	3	0 5 8
M	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 57 OBSERVATIONS IN DATA SET WERE USED IN THIS ANALYSIS.

DEPENDENT VARIABLE: DRVFLT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	1[illegible].[illegible]	44.14131143	6.13	0.0001	0.466696	5.7726
ERROR	49	[illegible].[illegible]	7.19419415		ROOT MSE		DRVFLT MEAN
CORRECTED TOTAL	56	[illegible]			2.80342526		48.56473860

SOURCE	DF	TYPE III SS	F VALUE	PR > F
DRVFLTN	1	210.[illegible]232	29.25	0.0001
A	2	35.[illegible]4	2.48	0.0947
M	2	18.[illegible]632	1.26	0.2931
A*M	2	5.[illegible]713	0.35	0.7046

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	33.[illegible]653	5.48	0.0234
A8 VS A0 & A5	1	3.[illegible]30	0.38	0.5382
M0 VS M2 MATH	1	0.[illegible]534	0.06	0.8072
M0 VS M1 MATH	1	15.[illegible]253	2.03	0.1603
M1 VS M2 MATH	1	13.[illegible]345	1.75	0.1918

PARAMETER		ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		62.47[illegible] B	3.83	0.0004	5.86701441
DRVFLTN		[illegible]	5.18	0.0001	0.11289790
A	0	-2.42[illegible] B	-1.51	0.1376	1.94118687
	5	-0.12[illegible] B	-0.10	0.9228	1.29238765
	8	0.00000000 B	.	.	.
M	0	-0.81[illegible] B	-0.57	0.5706	1.43240747
	1	-1.[illegible] B	-1.30	0.2013	1.45682416
	2	0.00000000 B	.	.	.
A*M	0 0	1.[illegible] B	0.84	0.4058	1.99019632
	0 1	0.96[illegible] B	0.47	0.6424	2.07000421
	0 2	0.00000000 B	.	.	.
	5 0	0.00000000 B	.	.	.
	5 1	0.00000000 B	.	.	.
	5 2	0.00000000 B	.	.	.
	8 0	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DETERMINED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER 'B' ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: (BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER 'B' ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

	LSMEAN	Std Err LSMEAN	Pr>|T| HO:LSMEAN=0	Pr>|T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	47.4727041	0.5302241	0.0001	1	.	0.0234	.
2	46.3036051	0.5750247	0.0001	2	0.0234	.	.
3	.	.	.	3	.	.	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

		LSMEAN	Std Err LSMEAN	Pr>|T| HO:LSMEAN=0	Pr>|T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3	4	5	6	7
6	0	46.2629019	0.4916000	0.0001	1	.	0.2316	0.5517	0.4094	0.9631	0.1881	0.3484
6	1	46.5828345	1.0819302	0.0001	2	0.2316	.	0.5443	0.0459	0.2174	0.0195	0.0354
5	2	47.4815600	1.0844171	0.0001	3	0.5517	0.5443	.	0.1594	0.5196	0.0593	0.1219
5	0	47.4547706	0.9381303	0.0001	4	0.4094	0.0459	0.1594	.	0.4377	0.5706	0.9228
5	1	47.4777735	0.9912290	0.0001	5	0.9631	0.2174	0.5196	0.4377	.	0.2013	0.3733
5	2	48.2647113	1.0541606	0.0001	6	0.1881	0.0195	0.0593	0.5706	0.2013	.	0.6202
4	0	47.5125151	0.9866005	0.0001	7	0.3484	0.0354	0.1219	0.9228	0.3733	0.6202	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

DEPENDENT VARIABLE: AVEL

SOURCE	DF	Type IV SS	F Value	Pr > F
MODEL	8	4[illegible]	71.33	0.0001
ERROR	1[illegible]	4[illegible]		
CORRECTED TOTAL	1[illegible]	4[illegible]	65.01	0.0001

R-SQUARE	C.V.	STD ERROR OF ESTIMATE
0.[illegible]	[illegible]	0.68490451
0.[illegible]	[illegible]	0.73274705
0.[illegible]	[illegible]	0.74381643

ORSOV (OPEN ROAD: STANDARD DEVIATION VELOCITY) 21:09 WEDNESDAY, APRIL 3, 1985 9

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
A	3	0 5 8
M	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 58 OBSERVATIONS IN DATA SET CAN BE USED IN THIS ANALYSIS.

DEPENDENT VARIABLE: ORSOVT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	177.[illegible]	25.34[illegible]	5.79	0.0001	0.447117	15.4520
ERROR	50	219.[illegible]	4.38[illegible]		ROOT MSE		ORSOVT MEAN
CORRECTED TOTAL	57	396.[illegible]			2.09454794		13.55517414

SOURCE	DF	TYPE III SS	F VALUE	PR > F
ORSOVO	1	124.41[illegible]	28.13	0.0001
A	2	0.2[illegible]	0.03	0.9746
M	2	1.[illegible]	0.12	0.8890
A*M	2	28.[illegible]	3.23	0.0481

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	0.04244955	0.01	0.9216
A8 VS A0 & A5	1	0.17[illegible]	0.04	0.8408
M0 VS M2 MAIN	1	0.24[illegible]	0.06	0.8079
M0 VS M1 MAIN	1	0.30[illegible]	0.07	0.7945
M1 VS M2 MAIN	1	1.03[illegible]	0.24	0.6294

PARAMETER			ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT			5.2[illegible] B	2.48	0.0167	2.11291555
ORSOVO			0.75[illegible] B	5.30	0.0001	0.14252442
A		0	-2.79[illegible] B	-1.96	0.0551	1.42260310
		5	-0.[illegible] B	-0.71	0.4828	0.96240343
		8	0.00000000 B	.	.	.
M		0	-1.[illegible] B	-1.31	0.1904	1.04333021
		1	-1.31[illegible] B	-1.24	0.2189	1.05614378
		2	0.00000000 B	.	.	.
A*M	0	0	3.13[illegible] B	2.14	0.0372	1.46526873
	0	1	3.38[illegible] B	2.24	0.0298	1.51179261
	0	2	0.00000000 B	.	.	.
	5	0	0.00000000 B	.	.	.
	5	1	0.00000000 B	.	.	.
	5	2	0.00000000 B	.	.	.
	8	0	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

2	13.37[illegible]	0.63[illegible]	0.0001	1	.	0.9216	.
5	13.[illegible]	0.61[illegible]	0.0001	2	0.9216	.	.
8	[illegible]	.	.	3	.	.	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

0	0	13.[illegible]	0.[illegible]	0.0001	1	.	0.7714	0.1025	0.3255	0.3684	0.7313	0.7349
0	1	13.[illegible]	0.[illegible]	0.0001	2	0.7714	.	0.0687	0.2095	0.2476	0.9491	0.5246
0	2	12.[illegible]	0.[illegible]	0.0001	3	0.1025	0.0687	.	0.4915	0.4551	0.0490	0.1759
5	0	13.[illegible]	0.[illegible]	0.0001	4	0.3255	0.2095	0.4915	.	0.9456	0.1904	0.4828
5	1	13.[illegible]	0.[illegible]	0.0001	5	0.3684	0.2476	0.4551	0.9456	.	0.2189	0.5433
5	2	13.[illegible]	0.[illegible]	0.1001	6	0.7313	0.9491	0.0490	0.1904	0.2189	.	0.4922
8	0	13.[illegible]	0.[illegible]	0.0001	7	0.7349	0.5246	0.1759	0.4828	0.5433	0.4922	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

0 0 1 0 0 1 0

DEPENDENT VARIABLE: [illegible]

PARAMETER	ESTIMATE	T FOR H0: PARAM=0	PR > |T|	STD ERROR OF ESTIMATE
MEAN	13.[illegible]	[illegible]	0.0001	0.50461706
MEAN	13.[illegible]	25.23	0.0001	0.54456887
MEAN	13.[illegible]	24.83	0.0001	0.54261487

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
A	3	0 5 9
M	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 62

NOTE: ALL DEPENDENT VARIABLES ARE CONSIDERED WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 48 OBSERVATIONS IN DATA SET CAN BE USED IN THIS ANALYSIS.

DEPENDENT VARIABLE: RSQUIST

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	5102.5[illegible]341	737.51412340	1.46	0.2078	0.203977	45.7273
ERROR	40	20147.05[illegible]159	503.67630954		ROOT MSE		RSQUIST MEAN
CORRECTED TOTAL	47	25249.0[illegible]524			22.44273400		49.07945833

SOURCE	DF	TYPE III SS	F VALUE	PR > F
RSQUIST	1	111.[illegible]433	0.22	0.6413
A	2	979.42[illegible]	0.97	0.3870
M	2	1177.[illegible]	1.17	0.3212
A*M	2	1[illegible]	1.49	0.1949

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	336.665[illegible]	0.67	0.4195
A0 VS A9 & A5	1	647.[illegible]	1.29	0.2636
M0 VS M2 MAIN	1	[illegible]	0.02	0.8952
M0 VS M1 MAIN	1	605.13[illegible]	1.20	0.2144
M1 VS M2 MAIN	1	874.[illegible]	1.74	0.1950

PARAMETER		ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		43.20[illegible] B	2.20	0.0335	20.53095044
RSQUIST		1.11320461	0.47	0.6413	0.24117941
A	0	-7.97[illegible] B	-0.44	0.6606	18.02136194
	5	15.68241571 B	1.35	0.1830	11.57436385
	9	0.00000000 B	.	.	.
M	0	-8.79015341 B	-0.69	0.4933	12.72193882
	1	-30.22[illegible] B	-2.32	0.0258	13.04722460
	2	0.00000000 B	.	.	.
A*M	0 0	15.11[illegible] B	0.82	0.4196	18.53320763
	0 1	36.[illegible] B	1.91	0.0639	19.21987377
	0 2	0.00000000 B	.	.	.
	5 0	0.00000000 B	.	.	.
	5 1	0.00000000 B	.	.	.
	5 2	0.00000000 B	.	.	.
	9 0	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (UM ARE ZEROS). IF EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

ROUTE (LOG SIGN FOLLOWING: DISTANCE AT WHICH ROUTE SIGN SEEN)

22:03 WEDNESDAY, APRIL 3, 1985

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

	LSMEAN	STD ERR LSMEAN	PROB > |T| H0:LSMEAN=0	PROB > |T| H0: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	47.3450041	5.4796217	0.0001	1	.	0.4185	.
2	53.8040041	5.1784824	0.0001	2	0.4185	.	.
3	[illegible]	.	.	3	.	.	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

I	J	LSMEAN	STD ERR LSMEAN	PROB > |T| H0:LSMEAN=0	PROB > |T| H0: LSMEAN(I)=LSMEAN(J) I/J	1	2	3	4	5	6	7
0	0	47.3450041	5.4796217	0.0001	1	.	0.9942	0.6447	0.4991	0.3019	0.2463	0.5593
0	1	47.6629451	8.4917879	0.0001	2	0.9942	.	0.6332	0.4716	0.2710	0.1998	0.5450
0	2	48.1527710	10.2025696	0.0001	3	0.6447	0.6332	.	0.2628	0.6141	0.1253	0.9490
5	6	54.1226643	7.9859475	0.0001	4	0.4991	0.4716	0.2628	.	0.0644	0.4933	0.1830
5	1	54.5983179	7.4344377	0.0001	5	0.3019	0.2710	0.6141	0.0644	.	0.0258	0.6166
5	2	55.9844227	10.1289332	0.0001	6	0.2463	0.1998	0.1253	0.4933	0.0258	.	0.0848
6	0	52.3298546	8.1663738	0.0001	7	0.5593	0.5450	0.9490	0.1830	0.6166	0.0848	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

0 0 0 0 1 1 1

DEPENDENT VARIABLE: ESTEST

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
[illegible]	[illegible]	0.01	0.0001	0.09747602
[illegible]	[illegible]	7.91	0.0001	5.81002515
[illegible]	[illegible]	7.91	0.0001	0.95170829

CLUSTER (GROUP STUDY FOLLOWING: NUMBER OF CORRECT TURNS) 21:09 WEDNESDAY, APRIL 3, 1985 13

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
S	3	A S B
A	3	A 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 42

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 50 OBSERVATIONS IN DATA SET WERE USED IN THIS ANALYSIS.

DEPENDENT VARIABLE: CTURN 1

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	5	5.15172020	1.02210280	0.64	0.7145	0.096685	18.0224
ERROR	42	66.86827980	1.59115428		ROOT MSE		CTURN MEAN
CORRECTED TOTAL	47	72.00000000			1.26156819		7.00000000

SOURCE	DF	TYPE III SS	F VALUE	PR > F
CLUSTER	1	2.33173633	1.47	0.2329
S	2	2.74653590	0.86	0.4301
A	2	0.21173633	0.07	0.9300
A*S	2	2.10953371	0.74	0.4819

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A1	1	2.23045414	1.41	0.2423
A0 VS A2 & A1	1	0.58332941	0.37	0.5469
A0 VS A2 MATH	1	0.04704235	0.03	0.8651
A1 VS A2 MATH	1	0.04702518	0.03	0.8643
A1 VS A2 MEAN	1	0.00043765	0.01	0.9391

PARAMETER		ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		5.76038648 B	5.44	0.0001	1.05852164
CLUSTER		0.13034716	1.21	0.2329	0.11281231
A	0	0.05153748 B	0.06	0.9518	0.98011721
	S	-0.72239646 B	-1.16	0.2518	0.62167318
	B	0.00000000 B	.	.	.
A	0	0.09086322 B	0.13	0.8946	0.68190816
	1	0.52638967 B	0.76	0.4504	0.68655812
	2	0.00000000 B	.	.	.
A*S	0 0	0.05277944 B	0.06	0.9560	1.00570279
	0 1	-0.96660181 B	-0.96	0.3415	1.00492773
	0 2	0.00000000 B	.	.	.
	S 0	0.00000000 B	.	.	.
	S 1	0.00000000 B	.	.	.
	S 2	0.00000000 B	.	.	.
	B 0	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO:(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

	CIDER LSMEAN	STD ERR LSMEAN	PR>|T| HO:LSMEAN=0	PR>|T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	7.18271154	0.26357654	0.0001	1	.	0.2423	.
2	6.71442430	0.27803857	0.0001	2	0.2423	.	.
3	NO-FAST	.	.	3	.	.	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

		CIDER LSMEAN	STD ERR LSMEAN	PR>|T| HO:LSMEAN=0	PR>|T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3	4	5	6	7
0	0	7.42307144	0.47307755	0.0001	1	.	0.3860	0.8442	0.2069	0.5408	0.1930	0.8579
0	1	6.93750313	0.47710722	0.0001	2	0.3860	.	0.5533	0.7074	0.7795	0.6331	0.4631
6	2	7.23142526	0.56623525	0.0001	3	0.8442	0.5533	.	0.3463	0.7260	0.3139	0.9647
5	0	6.55346522	0.44732247	0.0001	4	0.2069	0.7074	0.3463	.	0.4992	0.8946	0.2518
5	1	7.0225[illegible]7	0.45345523	0.0001	5	0.5408	0.7795	0.7260	0.4992	.	0.4508	0.6487
5	2	6.5000[illegible]	0.51533103	0.0001	6	0.1930	0.6331	0.3139	0.8946	0.4508	.	0.2310
8	3	7.31325362	0.42719504	0.0001	7	0.8579	0.4631	0.9647	0.2518	0.6487	0.2310	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

0 0 0 0 0 0 0

DEPENDENT VARIABLE: [illegible]

PARAMETER	[illegible]	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
MAKE DUMMY 0	[illegible]	21.55	0.0001	0.32676420
MAKE DUMMY 1	[illegible]	21.58	0.0001	0.33032362
MAKE DUMMY 2	[illegible]	17.97	0.0001	0.38365517

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
.	3	0 5 8
.	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 52

NOTE: ALL DEPENDENT VARIABLES ARE CONSIDERED WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 52 OBSERVATIONS IN DATA SET CAN BE USED IN THIS ANALYSIS.

DEPENDENT VARIABLE: ...SIPE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	1020[illegible].[illegible]	1[illegible].47111070	2.35	0.0395	0.272142	9.1970
ERROR	44	2751[illegible].[illegible]	625.25911456		ROOT MSE		RSTIMET MEAN
CORRECTED TOTAL	51	3771[illegible].[illegible]			25.00518175		271.88461731

SOURCE	DF	TYPE III SS	F VALUE	PR > F
RSTIME	1	[illegible].[illegible]	4.94	0.0314
A	2	1[illegible].[illegible]	1.26	0.2925
M	2	[illegible].[illegible]	0.51	0.5162
A*M	2	2[illegible].[illegible]	2.33	0.1099

CL TEST	DF	SS	F VALUE	PR > F
C VS A5	1	786.32412344	1.26	0.2682
C VS A8 A A5	1	854.94917147	1.37	0.2486
C VS M2 MAIN	1	477.12685841	0.76	0.3871
C VS M1 MAIN	1	2.27[illegible].[illegible]	0.00	0.9522
M1 VS M2 MAIN	1	528.72320201	0.85	0.3628

PARAMETER			ESTIMATE	T FOR H0: PARAMETER=0	PR > ITI	STD ERROR OF ESTIMATE
INTERCEPT			164.[illegible] B	5.06	0.0001	33.70626138
RSTIME			[illegible].[illegible]	2.22	0.0314	0.12676854
A		0	38.[illegible] B	2.02	0.0494	18.95110897
		5	8.[illegible] B	0.47	0.6043	11.98081279
		8	0.00000000 B	.	.	.
M		2	15.[illegible] B	1.51	0.1392	13.18930237
		1	30.[illegible] B	2.32	0.0251	13.14606113
		2	0.00000000 B	.	.	.
A*M	0	0	-22.[illegible] B	-1.13	0.2642	19.54122575
	0	1	-42.[illegible] B	-2.16	0.0354	19.57303502
	0	2	0.00000000 B	.	.	.
	5	0	0.00000000 B	.	.	.
	5	1	0.00000000 B	.	.	.
	5	2	0.00000000 B	.	.	.
	8	0	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DETERMINED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (UK ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: F(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

	[illegible]	[illegible]	PR > |T|	PROB > |T| HO: LSMEAN(I)=LSMEAN(J)			
			HO:LSMEAN=0	I/J	1	2	3
1	[illegible]	[illegible]	0.0001	1	.	0.2582	.
2	[illegible]	[illegible]	0.0001	2	0.2582	.	.
3	[illegible]	.	.	3	.	.	.

NOTE: To ensure overall protection level, only [illegible] ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

		[illegible]	[illegible]	PR > |T|	PROB > |T| HO: LSMEAN(I)=LSMEAN(J)							
		LSMEAN	HO:LSMEAN=0		I/J	1	2	3	4	5	6	7
0	0	231.737857	[illegible]	0.0001	1	.	0.0413	0.8809	0.5326	0.8690	0.0463	0.2007
0	1	271.133243	[illegible]	0.0001	2	0.0413	.	0.4396	0.9161	0.3419	0.1499	0.5999
0	2	242.965714	[illegible]	0.0001	3	0.8809	0.4396	.	0.4757	0.9866	0.0449	0.1853
5	0	232.[illegible]37	[illegible]	0.0001	4	0.5326	0.9161	0.4757	.	0.4003	0.1392	0.5043
5	1	[illegible]32	[illegible]	0.0001	5	0.8690	0.3419	0.9866	0.4003	.	0.0251	0.1250
5	2	232.[illegible]55	[illegible]	0.0001	6	0.0463	0.1499	0.0449	0.1392	0.0251	.	0.3448
6	0	234.[illegible]29	[illegible]	0.0001	7	0.2007	0.5999	0.1853	0.5043	0.1250	0.3448	.

NOTE: To ensure overall protection level, only PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible]

Parameter	[illegible]	[illegible]	PR > |T|	STD ERROR OF ESTIMATE
[illegible]	[illegible]	[illegible]	0.0001	0.52613643
[illegible] 1	[illegible]	[illegible]	0.0001	0.58256404
[illegible] 2	[illegible]	[illegible]	0.0001	7.50896147

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
	4	1 5 8
	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 48

DEPENDENT VARIABLE: X5

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	[illegible]	22385.6552082434	0.70	0.6826	0.120995	52.4876
ERROR	40	162706.9218[illegible]	2034.1505261250		ROOT MSE		X5 MEAN
CORRECTED TOTAL	47	[illegible]			168.62428811		321.26527083

SOURCE	DF	TYPE III SS	F VALUE	PR > F
X2	1	[illegible]	0.08	0.8588
A	2	[illegible]	1.26	0.3096
M	2	3[illegible]17.2371[illegible]	0.92	0.5616
A*M	2	3[illegible]7[illegible]35	0.73	0.5017

COVARIANCE	DF	SS	F VALUE	PR > F
X1 VS X5	1	18[illegible].61771251	2.68	0.1235
AM VS X1 X X5	1	4.02[illegible]2034	0.00	0.9604
M1 VS X2 EALIC	1	[illegible]1213423	1.11	0.7434
M1 VS X1 EALIC	1	17[illegible].66[illegible]311	0.61	0.4345
M1 VS X2 EALIC	1	237.1.59[illegible]2697	1.19	0.2827

PARAMETER		ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		3[illegible].1[illegible] B	3.65	0.0040	124.17295478
X2		[illegible]3.[illegible]	0.17	0.8688	0.2292[illegible]
A	0	-1[illegible].[illegible] B	-1.04	0.3045	130.26790657
	1	32.60[illegible]31[illegible] B	0.34	0.7319	94.52440384
	2	[illegible] B	.	.	.
M	0	-[illegible] B	-0.79	0.4371	90.27048490
	1	-147.71[illegible]021 B	-1.56	0.1263	94.58768115
	2	0.00000000 B	.	.	.
A*M	0 0	1[illegible].[illegible] B	0.90	0.6282	125.68561256
	0 1	15[illegible].[illegible] B	1.16	0.2541	132.88686529
	0 2	0.00000000 B	.	.	.
	1 0	0.00000000 B	.	.	.
	1 1	0.00000000 B	.	.	.
	1 2	0.00000000 B	.	.	.
	2 0	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DETERMINED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETERS BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: PARAMETER=0 = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

	LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) 1	2	3
0	270.292000	30.650534	0.0001	1	.	0.1235
5	342.132374	34.657217	0.0001	2	0.1235	.
X	[illegible]	.	.	3	.	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

A	C	LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) 1	2	3	4	5	6	7
0	0	245.588526	44.885497	0.0001	1	.	0.7910	0.7371	0.4495	0.9159	0.1275	0.7064
0	1	272.451185	44.637004	0.0001	2	0.7910	.	0.9480	0.3206	0.8441	0.0809	0.5434
0	2	266.452344	44.258457	0.0002	3	0.7371	0.9480	.	0.2950	0.8341	0.0760	0.4987
5	0	303.124784	43.938343	0.0001	4	0.4495	0.3206	0.2950	.	0.4189	0.4371	0.7319
5	1	299.211165	44.241126	0.0002	5	0.9159	0.8441	0.8341	0.4189	.	0.1263	0.6523
5	2	443.501205	44.522163	0.0001	6	0.1275	0.0809	0.0760	0.4371	0.1263	.	0.2839
X	0	330.519627	44.145385	0.0001	7	0.7064	0.5434	0.4987	0.7319	0.6523	0.2839	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

DEPENDENT VARIABLE: XS

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT	[illegible]	7.55	0.0001	43.51662421
C 0	[illegible]	5.26	0.3031	46.96814564
C 1	[illegible]	7.11	0.0001	45.07632494

DEPENDENT VARIABLE: AMPA A 0.4-1.0 (X=BASELINE, X6=TREATMENT) 23:03 WEDNESDAY, APRIL 3, 1985

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
A	3	0 5 A
	3	A 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 49

DEPENDENT VARIABLE: AA

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	0.[illegible]	0.00550841	0.97	0.4674	0.144862	37.4665
ERROR	41	0.[illegible]	0.00568888		ROOT MSE		AA MEAN
CORRECTED TOTAL	48	0.[illegible]			0.07542617		0.20131096

SOURCE	DF	TYPE III SS	F VALUE	PR > F
A3	1	0.01755[illegible]	3.09	0.0866
A	2	0.00771357	0.85	0.4318
[illegible]	2	0.00410[illegible]	0.36	0.6995
A*[illegible]	2	0.00114002	0.10	0.9057

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	0.00502859	0.18	0.3528
A VS A0 & A5	1	0.00934449	0.31	0.3747
A0 VS A2 MAIN	1	0.00030419	0.01	0.9304
A0 VS A1 MAIN	1	0.00778[illegible]	0.49	0.4882
A1 VS A2 MAIN	1	0.00[illegible]	0.61	0.4346

PARAMETER			ESTIMATE		T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT			0.11005444	B	2.09	0.0426	0.05677195
A3			0.26502444		1.76	0.0866	0.15122200
A	0		0.03105192	B	0.54	0.5926	0.05868030
	5		0.02107288	B	0.52	0.6051	0.04196696
	A		0.00000000	B	.	.	.
A*	0		-0.00353067	B	-0.09	0.9311	0.04055242
	1		0.00966340	B	0.23	0.8156	0.04201441
	2		0.00000000	B	.	.	.
A3*	0	0	0.01200864	B	0.21	0.8322	0.05630622
	0	1	0.02503459	B	0.45	0.6581	0.05821359
	0	2	0.00000000	B	.	.	.
	5	0	0.00000000	B	.	.	.
	5	1	0.00000000	B	.	.	.
	5	2	0.00000000	B	.	.	.
	A	0	0.00000000	B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN OBSERVED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

[illegible] VARIABLE: AREA > 0.0-1.0 (A1=MASFLUE, A6=TREATMENT)

[illegible] LEAST SQUARES MEANS

NOTE: To ensure overall protection [illegible] PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

						1	2	3	4	5	6	7
0	0	0.21[illegible]	[illegible]	<.0001	1	.	0.4494	0.8292	0.5805	0.8415	0.6473	0.2915
0	1	0.23831[illegible]	0.02[illegible]	<.0001	2	0.4494	.	0.3919	0.2305	0.4034	0.2664	0.0985
0	2	0.20243111	0.02[illegible]	<.0001	3	0.8292	0.3919	.	0.7435	0.9984	0.8123	0.4081
5	1	0.1[illegible]	0.02[illegible]	<.0001	4	0.5805	0.2305	0.7435	.	0.7541	0.9311	0.6051
5	2	0.[illegible]	0.[illegible]	<.0001	5	0.8415	0.4034	0.9984	0.7541	.	0.8156	0.4270
8	0	0.1[illegible]	0.03075345	<.0001	7	0.2915	0.0985	0.4081	0.6051	0.4270	0.5499	.

NOTE: To ensure overall protection [illegible] PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

DEPENDENT VARIABLE: [illegible]

PARAMETER	ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
MAINDIANA 0	0.[illegible]	13.[illegible]	0.0001	0.01963242
MAINDIANA 1	0.22[illegible]	10.80	0.0001	0.02114567
MAINDIANA 2	0.[illegible]	[illegible]	0.0001	0.02015800

[illegible] VARIABLE: DAYVALUE (1=BASELINE VALUE, X4=TREATMENT VALUE)

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
A	3	0 5 8
M	3	0 1 2

NUMBER OF OBSERVATIONS IN DATA SET = 48

DEPENDENT VARIABLE: X4

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	5	1412.81716352	273.25959201	1.23	0.3095	0.177124	63.5479
ERROR	40	6806.48190129	222.16204203		ROOT MSE		X4 MEAN
CORRECTED TOTAL	47	[illegible]			14.90510144		23.45490625

SOURCE	DF	TYPE III SS	F VALUE	PR > F
X1	1	[illegible]	0.11	0.7366
A	2	524.93131754	2.04	0.1375
M	2	444.51233336	1.00	0.3775
A*M	2	531.03077403	1.21	0.3081

CONTRAST	DF	SS	F VALUE	PR > F
A0 VS A5	1	776.97374251	3.45	0.0538
A8 VS A0 & A5	1	44.08653448	0.20	0.6585
M0 VS M2 MAIN	1	182.99587484	0.82	0.3695
M0 VS M1 M210	1	60.85900043	0.27	0.6036
M1 VS M2 MAIN	1	420.18376020	1.93	0.1722

PARAMETER			ESTIMATE	T FOR H0: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT			+0.02301064 B	1.53	0.0011	11.34336165
X1			-0.08764794	-0.33	0.7394	0.26227721
A	0		-20.68323579 B	-1.78	0.0819	11.59238068
	5		-1.11814705 B	-0.13	0.8935	8.29899949
	8		0.00000000 B	.	.	.
M	0		-12.72634787 B	-1.59	0.1189	7.98488879
	1		-15.68194855 B	-1.88	0.0668	8.31009532
	2		0.00000000 B	.	.	.
A*M	0	0	15.38377464 B	1.34	0.1740	11.11526519
	0	1	15.29315294 B	1.31	0.1972	11.66395994
	0	2	0.00000000 B	.	.	.
	5	0	0.00000000 B	.	.	.
	5	1	0.00000000 B	.	.	.
	5	2	0.00000000 B	.	.	.
	8	0	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS, FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS H0: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

[illegible]: PRAVALUE(X1=BASELINE VALUE, X4=TREATMENT VALUE)

23:03 WEDNESDAY, APRIL 3, 1985

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

	LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	[illegible]	4.2113565	0.0531	1	.	0.0538	.
2	[illegible]	3.8753171	0.0001	2	0.0538	.	.
3	[illegible]	.	.	3	.	.	.

NOTE: TO ENSURE OVERALL [illegible] LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

A	D	LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3	4	5	6	7
0	0	[illegible]	5.4215573	0.0004	1	.	0.7005	0.7324	0.5940	0.8786	0.0378	0.5156
0	1	[illegible]	5.0514577	0.0038	2	0.7005	.	0.9441	0.3711	0.6093	0.0167	0.3222
0	2	[illegible]	5.7145715	0.0035	3	0.7324	0.9441	.	0.4015	0.6440	0.0213	0.3459
1	0	[illegible]	5.0514577	0.0001	4	0.5940	0.3711	0.4015	.	0.7252	0.1189	0.4935
1	1	[illegible]	4.8619571	0.0010	5	0.8786	0.6093	0.6440	0.7252	.	0.0468	0.4404
1	2	[illegible]	5.0514577	0.0001	6	0.0378	0.0167	0.0213	0.1189	0.0468	.	0.1715
2	0	[illegible]	5.0514577	0.0001	7	0.5156	0.3222	0.3459	0.4935	0.4404	0.1715	.

NOTE: TO ENSURE OVERALL [illegible] LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

TREATMENT VARIABLE: A1

PARAMETER	ESTIMATE	T FOR HO: PARAMETER=0	PROB > |T|	STD ERROR OF ESTIMATE
[illegible]	[illegible]	[illegible]	0.0001	3.96333124
[illegible]	[illegible]	[illegible]	0.0001	4.16272023
[illegible]	[illegible]	[illegible]	0.0001	3.98460939

Appendix D-2

Morning After: 1 X 4 Analyses of Covariance

Treatments	0,0;	0,0.08%;	200, 0.05%;	200, 0%

Analyses of Covariance

1.	PHTIME	Peripheral Detection:	Mean Reaction Time
2.	PHSDTM		St. Dev. Reaction Time
3.	PCORR		Number Correct
4.	VMVEL	Velocity Maintenance:	Mean Velocity
5.	VMSDVL		St. Dev. Velocity
6.	CFRVEL	Curve Following Runway:	Mean Velocity
7.	CFRSDVL		St. Dev. Velocity
8.	CFORVEL	Curve Following Open Road:	Mean Velocity
9.	CFORSDVL		St. Dev. Velocity
10.	CFBRK		Mean Max. Brake Pressure
11.	CFACC		Mean Max Acceleration
12.	BRVEL	Bridge Task:	Mean Velocity
13.	LCHDWY	Lead Car Following:	Mean Headway
14.	LCSDHD		St. Dev. Headway
15.	ORVEL	Open Road:	Mean Velocity
16.	ORSDV		St. Dev. Velocity
17.	CORRTURN	Road Sign Following:	No. of Corr. Turns
18.	RSDIST		Distance at Which Route Sign Seen
19.	RSTIME		Time to Complete Circuit
20.	TOTPOW	Velocity Main Power Spectra:	Total Power
21.	AREA % 0.2/0.4		Peak Frequency (0-0.2HZ/0-0.4HZ)
22.	AREA % 0.0-0.4		% High Frequency Area (>0.4HZ)

1

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	0.34802025	0.08700506	0.43	0.7834	0.076144	19.1108
ERROR	21	4.22255560	0.20107408		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	25	4.57057585			0.44841284		2.34638462

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	0.15941001	0.79	0.3833	1	0.09036196	0.45	0.5099
DRUG	3	0.18861024	0.31	0.8160	3	0.18861024	0.31	0.8160

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		1.71146543 B	2.32	0.0306	0.73815964
BASE		0.20507445	0.67	0.5099	0.30591218
DRUG	0	0.15957301 B	0.67	0.5129	0.23975232
	1	0.20820286 B	0.78	0.4421	0.26572857
	2	0.20843969 B	0.85	0.4062	0.24590800
	3	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	2.36683827	0.17158350	0.0001
1	2.41546812	0.20150536	0.0001
2	2.41570496	0.17282393	0.0001
3	2.20726526	0.17079891	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	0.05647581	0.01411895	0.57	0.6864	0.098126	17.2597
ERROR	21	0.51906861	0.02471755		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	25	0.57554442			0.15721817		0.91090000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	0.02920653	1.18	0.2893	1	0.02193368	0.89	0.3569
DRUG	3	0.02726928	0.37	0.7770	3	0.02726928	0.37	0.7770

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		1.13963662 B	4.97	0.0001	0.22947563
BASE		-0.22052573	-0.94	0.3569	0.23410260
DRUG	0	-0.02499090 B	-0.30	0.7703	0.08450900
	1	-0.06918408 B	-0.73	0.4756	0.09523462
	2	0.02368515 B	0.28	0.7847	0.08560035
	3	0.00000000 B	.	.	.

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GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	0.89956528	0.06143554	0.0001
1	0.85537210	0.07250862	0.0001
2	0.94824132	0.06019544	0.0001
3	0.92455618	0.05979647	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	203.95706946	50.98926737	1.69	0.2163	0.360533	14.1312
ERROR	12	361.75216329	30.14601361		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	16	565.70923276			5.49053855		38.85412941

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	0.14355596	0.00	0.9461	1	8.23876085	0.27	0.6106
DRUG	3	203.81351350	2.25	0.1345	3	203.81351350	2.25	0.1345

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		46.21365341 B	4.18	0.0013	11.04988865
BASE		-0.14576070	-0.52	0.6106	0.27882033
DRUG	0	-6.73516495 B	-1.94	0.0760	3.46856593
	1	1.20067688 B	0.28	0.7808	4.21785483
	2	1.35793747 B	0.32	0.7562	4.27429034
	3	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER

SAS
TYPE=PCORR

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	34.0445613	2.3228615	0.0001
1	41.9804032	3.5913116	0.0001
2	42.1376637	3.3557805	0.0001
3	40.7797263	2.4845599	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	54.74318083	13.68579521	1.89	0.1514	0.274417	3.1938
ERROR	20	144.74603315	7.23730166		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	24	199.48921398			2.69022335		84.23202000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	35.03914439	4.84	0.0397	1	31.35982698	4.33	0.0504
DRUG	3	19.70403644	0.91	0.4550	3	19.70403644	0.91	0.4550

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		35.92363371 B	1.57	0.1313	22.82975637
BASE		0.56152913	2.08	0.0504	0.26975767
DRUG	0	2.32598652 B	1.62	0.1215	1.43809608
	1	0.93484843 B	0.57	0.5754	1.64149342
	2	0.74734641 B	0.50	0.6231	1.49713619
	3	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

SAS
TYPE=VMVEL

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	85.5403975	1.0192711	0.0001
1	84.1492594	1.2595932	0.0001
2	83.9617574	1.1053402	0.0001
3	83.2144109	1.0206695	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	2.85041458	0.71260364	1.11	0.3798	0.181523	32.0178
ERROR	20	12.85237124	0.64261856		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	24	15.70278582			0.80163493		2.50372000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	0.28447952	0.44	0.5134	1	0.03152940	0.05	0.8269
DRUG	3	2.56593506	1.33	0.2923	3	2.56593506	1.33	0.2923

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		2.21883530 B	3.70	0.0014	0.59953785
BASE		0.04678750	0.22	0.8269	0.21122660
DRUG	0	0.06228614 B	0.14	0.8899	0.44443154
	1	0.80253902 B	1.65	0.1140	0.48561425
	2	-0.09006037 B	-0.20	0.8422	0.44649264
	3	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

SAS
TYPE=VMSDVL

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	2.40967271	0.30793087	0.0001
1	3.14992559	0.36373271	0.0001
2	2.25732619	0.32992512	0.0001
3	2.34738656	0.30947294	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	19.68431831	4.92107958	0.12	0.9720	0.025479	20.4156
ERROR	19	752.87988420	39.62525706		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	23	772.56420251			6.29485957		30.83359583

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	14.35346959	0.36	0.5544	1	11.77012380	0.30	0.5921
DRUG	3	5.33084871	0.04	0.9870	3	5.33084871	0.04	0.9870

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		26.68921600 B	3.52	0.0023	7.58075576
BASE		0.13167642	0.55	0.5921	0.24160368
DRUG	0	0.85969102 B	0.25	0.8089	3.50512234
	1	0.43406864 B	0.12	0.9079	3.70084149
	2	-0.41401696 B	-0.12	0.9074	3.51307044
	3	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: E(BIASED ESTIMATOR) = 0 ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER

SAS
TYPE=CFRVEL

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	31.4914374	2.5721547	0.0001
1	31.0658150	2.8306813	0.0001
2	30.2177294	2.5888695	0.0001
3	30.6317464	2.3795079	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	25.39680436	6.34922609	3.35	0.0311	0.413255	35.2703
ERROR	19	36.05880645	1.89783192		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	23	61.45571081			1.37761820		3.90588333

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	22.94984026	12.09	0.0025	1	19.78789608	10.43	0.0044
DRUG	3	2.44706411	0.43	0.7340	3	2.44706411	0.43	0.7340

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		1.86891289 B	2.41	0.0264	0.77660401
BASE		0.48432202	3.23	0.0044	0.14999034
DRUG	0	-0.62473816 B	-0.81	0.4287	0.77253994
	1	0.26738506 B	0.32	0.7547	0.84362731
	2	0.00349301 B	0.00	0.9964	0.76743681
	3	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

SAS
TYPE=CFRSDVL

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	3.38075124	0.56252646	0.0001
1	4.27287447	0.63691483	0.0001
2	4.00898241	0.56431359	0.0001
3	4.00548940	0.52766206	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	242.76647452	60.69161863	4.76	0.0085	0.513787	7.3906
ERROR	18	229.73748106	12.76319395		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	22	472.50396557			3.57256126		48.33953478

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	7.28026068	0.57	0.4589	1	8.90873743	0.70	0.4144
DRUG	3	235.48621384	6.15	0.0046	3	235.48621384	6.15	0.0046

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		32.66108743 B	2.58	0.0188	12.65208918
BASE		0.21765446	0.84	0.4144	0.26051887
DRUG	0	7.62769842 B	3.82	0.0012	1.99554260
	1	7.74235371 B	3.57	0.0022	2.16628634
	2	5.01826245 B	2.24	0.0382	2.24294155
	3	0.00000000 B	.	.	.

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SAS
TYPE=CFORVEL

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	50.8717128	1.3784898	0.0001
1	50.9863681	1.5977635	0.0001
2	48.2622768	1.6720447	0.0001
3	43.2440144	1.4618728	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V
MODEL	4	4.22944679	1.05736170	0.93	0.4661	0.172012	25.2364
ERROR	18	20.35870582	1.13103921		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	22	24.58815261			1.06350327		4.21416522

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	1.17585165	1.04	0.3214	1	1.42270498	1.26	0.2768
DRUG	3	3.05359513	0.90	0.4605	3	3.05359513	0.90	0.4605

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		5.89827796 B	3.48	0.0027	1.69433165
BASE		-0.50546783	-1.12	0.2768	0.45068689
DRUG	0	-0.08991562 B	-0.15	0.8832	0.60328710
	1	0.24921022 B	0.34	0.7399	0.73902529
	2	0.89461597 B	1.38	0.1852	0.64938740
	3	0.00000000 B	.	.	.

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SAS
TYPE=CFORSDVL

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	3.90295722	0.43998927	0.0001
1	4.24208326	0.56307563	0.0001
2	4.88748900	0.47614310	0.0001
3	3.99287303	0.43845778	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	19.37739896	4.84434974	2.22	0.1017	0.297104	26.8316
ERROR	21	45.84362266	2.18302965		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	25	65.22102162			1.47750792		5.50660000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	17.25736353	7.91	0.0105	1	9.10016611	4.17	0.0539
DRUG	3	2.12003543	0.32	0.8082	3	2.12003543	0.32	0.8082

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		2.85187944 B	2.08	0.0495	1.36784986
BASE		0.45554397	2.04	0.0539	0.22311844
DRUG	0	0.32896186 B	0.39	0.7026	0.84992906
	1	-0.61203810 B	-0.70	0.4923	0.87572904
	2	0.00730346 B	0.01	0.9927	0.79012254
	3	0.00000000 B	.	.	.

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SAS
TYPE=CFBRK

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	5.86272853	0.61152819	0.0001
1	4.92172856	0.69055777	0.0001
2	5.54107012	0.55994814	0.0001
3	5.53376666	0.56220256	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	0.00218740	0.00054685	4.11	0.0129	0.439116	12.3496
ERROR	21	0.00279396	0.00013305		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	25	0.00498136			0.01153455		0.09340000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	0.00208596	15.68	0.0007	1	0.00217299	16.33	0.0006
DRUG	3	0.00010144	0.25	0.8575	3	0.00010144	0.25	0.8575

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		0.04379088 B	3.35	0.0031	0.01308984
BASE		0.60829942	4.04	0.0006	0.15051827
DRUG	0	0.00045056 B	0.07	0.9425	0.00616706
	1	-0.00104333 B	-0.15	0.8790	0.00676784
	2	-0.00446757 B	-0.72	0.4800	0.00621202
	3	0.00000000 B	.	.	.

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SAS
TYPE=CFACC

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	0.09513271	0.00437705	0.0001
1	0.09363881	0.00516167	0.0001
2	0.09021457	0.00438926	0.0001
3	0.09468214	0.00436682	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	80.20156019	20.05039005	0.48	0.7507	0.091630	25.3600
ERROR	19	795.07846190	41.84623484		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	23	875.28002209			6.46886658		25.50813333

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	2.63593507	0.06	0.8045	1	4.62899275	0.11	0.7431
DRUG	3	77.56562512	0.62	0.6119	3	77.56562512	0.62	0.6119

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		23.79244256 B	3.88	0.0010	6.13273956
BASE		0.07804363	0.33	0.7431	0.23465100
DRUG	0	2.14105860 B	0.58	0.5693	3.69739014
	1	0.53802242 B	0.13	0.8993	4.19449747
	2	-2.52837169 B	-0.70	0.4939	3.62456454
	3	0.00000000 B	.	.	.

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SAS
TYPE=BRVEL

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	27.6724878	2.5041561	0.0001
1	26.0694517	3.3101155	0.0001
2	23.0030576	2.4481313	0.0001
3	25.5314292	2.6586235	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	12867.62062477	3216.90515619	17.28	0.0001	0.841661	13.5826
ERROR	13	2420.75075235	186.21159633		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	17	15288.37137712			13.64593699		100.46603333

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	12052.95769264	64.73	0.0001	1	10126.92819285	54.38	0.0001
DRUG	3	814.66293213	1.46	0.2716	3	814.66293213	1.46	0.2716

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		12.06300256 B	0.79	0.4452	15.32176576
BASE		0.86548691	7.37	0.0001	0.11736132
DRUG	0	-3.56736909 B	-0.38	0.7077	9.30712515
	1	-17.53317080 B	-1.55	0.1463	11.34603232
	2	-13.61193827 B	-1.71	0.1112	7.96601659
	3	0.00000000 B	.	.	.

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SAS
TYPE=LCHDWY

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	104.176856	7.033297	0.0001
1	90.211054	9.685991	0.0001
2	94.132287	5.572243	0.0001
3	107.744225	5.720277	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	75.20971553	18.80242888	0.45	0.7736	0.120624	39.7930
ERROR	13	548.29794950	42.17676535		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	17	623.50766503			6.49436412		16.32037778

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	9.07663654	0.22	0.6504	1	15.08165897	0.36	0.5601
DRUG	3	66.13307899	0.52	0.6742	3	66.13307899	0.52	0.6742

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		13.07619314 B	1.98	0.0691	6.60065145
BASE		0.21220351	0.60	0.5601	0.35486620
DRUG	0	-2.91676537 B	-0.70	0.4988	4.19227611
	1	-2.49239201 B	-0.47	0.6461	5.30276813
	2	1.91414252 B	0.51	0.6205	3.77428212
	3	0.00000000 B	.	.	.

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SAS
TYPE=LCSDHD

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	13.6906674	3.2520884	0.0010
1	14.1150408	4.5933126	0.0089
2	18.5215753	2.6673560	0.0001
3	16.6074328	2.6549803	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	55.20238843	13.80059711	1.38	0.2808	0.234486	6.1697
ERROR	18	180.21593430	10.01199635		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	22	235.41832274			3.16417388		51.28559130

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	19.40512037	1.94	0.1808	1	25.15801135	2.51	0.1303
DRUG	3	35.79726807	1.19	0.3409	3	35.79726807	1.19	0.3409

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		29.68751971 B	2.37	0.0294	12.54905099
BASE		0.38484658	1.59	0.1303	0.24277827
DRUG	0	3.55415340 B	1.88	0.0766	1.89200243
	1	1.95734109 B	1.02	0.3215	1.92012878
	2	1.70510475 B	0.88	0.3892	1.93256706
	3	0.00000000 B	.	.	.

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SAS
TYPE=ORVEL

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	53.0422554	1.3855125	0.0001
1	51.4454431	1.4214402	0.0001
2	51.1932067	1.4336176	0.0001
3	49.4881020	1.2917979	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	68.62428746	17.15607186	6.98	0.0014	0.608037	10.8316
ERROR	18	44.23767906	2.45764884		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	22	112.86196652			1.56768901		14.47334348

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	61.96973390	25.22	0.0001	1	43.43741129	17.67	0.0005
DRUG	3	6.65455356	0.90	0.4592	3	6.65455356	0.90	0.4592

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		1.96630056 B	0.58	0.5710	3.40695380
BASE		0.95004994	4.20	0.0005	0.22598228
DRUG	0	-0.79514791 B	-0.83	0.4182	0.95958187
	1	-0.12657096 B	-0.11	0.9137	1.15153852
	2	-1.35228100 B	-1.49	0.1526	0.90546838
	3	0.00000000 B	.	.	.

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SAS
TYPE=ORSDV

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	14.2659098	0.6459172	0.0001
1	14.9344868	0.8174297	0.0001
2	13.7087767	0.6723141	0.0001
3	15.0610578	0.6806000	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	5.10130766	1.27532691	0.98	0.4455	0.187048	18.4738
ERROR	17	22.17141962	1.30420115		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	21	27.27272727			1.14201627		6.18181818

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	0.17188694	0.13	0.7211	1	2.23572324	1.71	0.2079
DRUG	3	4.92942072	1.26	0.3196	3	4.92942072	1.26	0.3196

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		5.55233469 B	5.14	0.0001	1.08116482
BASE		0.27123159	1.31	0.2079	0.20715887
DRUG	0	-1.36132874 B	-1.84	0.0838	0.74115411
	1	-0.79410843 B	-1.01	0.3280	0.78844880
	2	-1.36054528 B	-1.67	0.1127	0.81332709
	3	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	5.76908065	0.43685040	0.0001
1	6.33630096	0.57479994	0.0001
2	5.76986411	0.49825933	0.0001
3	7.13040939	0.56967041	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	9027.27932128	2256.81983032	6.85	0.0021	0.631355	24.8710
ERROR	16	5270.99045954	329.43690372		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	20	14298.26978081			18.15039679		72.97824762

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	8639.89575740	26.23	0.0001	1	8556.17909799	25.97	0.0001
DRUG	3	387.38356388	0.39	0.7604	3	387.38356388	0.39	0.7604

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		8.93797653 B	0.56	0.5849	16.03040660
BASE		0.76907423	5.10	0.0001	0.15090876
DRUG	0	11.91187114 B	0.98	0.3417	12.15488066
	1	12.47826193 B	0.95	0.3558	13.12226510
	2	8.00825402 B	0.68	0.5070	11.79735674
	3	0.00000000 B			

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

SAS
TYPE=RSDIST

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	76.2546107	7.1285666	0.0001
1	76.8210015	9.0836401	0.0001
2	72.3509935	7.4717648	0.0001
3	64.3427395	9.3726706	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	1235.90700143	308.97675036	0.34	0.8466	0.083187	12.5038
ERROR	15	13621.01225861	908.06748391		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	19	14856.91926004			30.13415809		240.99997500

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	0.67611132	0.00	0.9786	1	2.09842143	0.00	0.9623
DRUG	3	1235.23089011	0.45	0.7187	3	1235.23089011	0.45	0.7187

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		243.05397658 B	3.98	0.0012	61.04178007
BASE		0.01070401	0.05	0.9623	0.22266873
DRUG	0	-15.19450596 B	-0.73	0.4762	20.79454995
	1	4.51567326 B	0.20	0.8475	23.07898060
	2	-1.55382926 B	-0.07	0.9431	21.41725669
	3	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

SAS
TYPE=RSTIME

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

DRUG	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
0	230.686560	11.393998	0.0001
1	250.396739	15.200946	0.0001
2	244.327237	12.441981	0.0001
3	245.881066	17.400555	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	119994.712-3254	29998.67810814	6.48	0.0036	0.649179	30.1342
ERROR	14	64846.10105514	4631.86436108		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	18	184840.81348768			68.05780162		225.84926316

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	94252.97016648	20.35	0.0005	1	72729.50516669	15.70	0.0014
GROUP	3	25741.74226607	1.85	0.1841	3	25741.74226607	1.85	0.1841

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		27.90757771 B	0.58	0.5703	48.01431462
BASE		0.64788980	3.96	0.0014	0.16350225
GROUP	1	65.00773168 B	1.48	0.1615	43.97934500
	3	-9.05677775 B	-0.17	0.8647	52.19133508
	6	79.60715934 B	1.76	0.1009	45.32664910
	7	0.00000000 B	.	.	.

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

GROUP	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
1	246.619152	27.930934	0.0001
3	172.554643	39.293826	0.0006
6	261.218580	28.477719	0.0001
7	181.611420	34.382088	0.0001

AREA PERCENTAGE 0.0 - 0.2 / 0.0 - 0.4 FREQ.
ONE BY FOUR ANALYSIS OF COVARIANCE GROUP = 1 3 6 7

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	0.03907895	0.00976974	1.52	0.2498	0.302825	13.1652
ERROR	14	0.08996924	0.00642637		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	18	0.12904819			0.08016467		0.60891232

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	0.02442578	3.80	0.0715	1	0.03047061	4.74	0.0470
GROUP	3	0.01465317	0.76	0.5350	3	0.01465317	0.76	0.5350

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		0.27213765 B	1.56	0.1406	0.17424049
BASE		0.58753804	2.18	0.0470	0.26982265
GROUP	1	-0.07984918 B	-1.48	0.1617	0.05404937
	3	-0.05265051 B	-0.86	0.4060	0.06144687
	6	-0.03984221 B	-0.76	0.4579	0.05219645
	7	0.00000000 B			

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

MORNING AFTER
AREA PERCENTAGE 0.0 - 0.2 / 0.0 - 0.4 FREQ.
ONE BY FOUR ANALYSIS OF COVARIANCE GROUP = 1 3 6 7

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

GROUP	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
1	0.57517365	0.03403391	0.0001
3	0.60237233	0.04768220	0.0001
6	0.61518062	0.03273209	0.0001
7	0.65502284	0.04056973	0.0001

MORNING AFTER
AREA PERCENTAGE 0.0 - 0.4 FREQ.
ONE BY FOUR ANALYSIS OF COVARIANCE GROUP = 1 3 6 7

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TREAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	0.03834053	0.00958513	5.18	0.0090	0.596642	23.7523
ERROR	14	0.02592001	0.00185143		ROOT MSE		TREAT MEAN
CORRECTED TOTAL	18	0.06426054			0.04302824		0.18115421

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE III SS	F VALUE	PR > F
BASE	1	0.03698307	19.98	0.0005	1	0.02627901	14.19	0.0021
GROUP	3	0.00135746	0.24	0.8639	3	0.00135746	0.24	0.8639

PARAMETER		ESTIMATE	T FOR HO: PARAMETER=0	PR > |T|	STD ERROR OF ESTIMATE
INTERCEPT		0.06952737 B	1.69	0.1135	0.04118649
BASE		0.49371417	3.77	0.0021	0.13104627
GROUP	1	0.01254992 B	0.39	0.7005	0.03196664
	3	0.02764425 B	0.84	0.4147	0.03288863
	6	0.01585949 B	0.52	0.6090	0.03030796
	7	0.00000000 B			

NOTE: THE X'X MATRIX HAS BEEN DEEMED SINGULAR AND A GENERALIZED INVERSE HAS BEEN EMPLOYED TO SOLVE THE NORMAL EQUATIONS. THE ABOVE ESTIMATES REPRESENT ONLY ONE OF MANY POSSIBLE SOLUTIONS TO THE NORMAL EQUATIONS. ESTIMATES FOLLOWED BY THE LETTER B ARE BIASED AND DO NOT ESTIMATE THE PARAMETER BUT ARE BLUE FOR SOME LINEAR COMBINATION OF PARAMETERS (OR ARE ZERO). THE EXPECTED VALUE OF THE BIASED ESTIMATORS MAY BE OBTAINED FROM THE GENERAL FORM OF ESTIMABLE FUNCTIONS. FOR THE BIASED ESTIMATORS, THE STD ERR IS THAT OF THE BIASED ESTIMATOR AND THE T VALUE TESTS HO: E(BIASED ESTIMATOR) = 0. ESTIMATES NOT FOLLOWED BY THE LETTER B ARE BLUE FOR THE PARAMETER.

MORNING AFTER
AREA PERCENTAGE 0.0 - 0.4 FREQ.
ONE BY FOUR ANALYSIS OF COVARIANCE GROUP = 1 3 6 7

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

GROUP	TREAT LSMEAN	STD ERR LSMEAN	PROB > |T| HO:LSMEAN=0
1	0.18036786	0.01883414	0.0001
3	0.19546219	0.02602095	0.0001
6	0.18367742	0.01783742	0.0001
7	0.16781794	0.02333296	0.0001

APPENDIX E

POWER SPECTRA OF STEERING WHEEL ANGLE-VELOCITY MAINTENANCE TASK

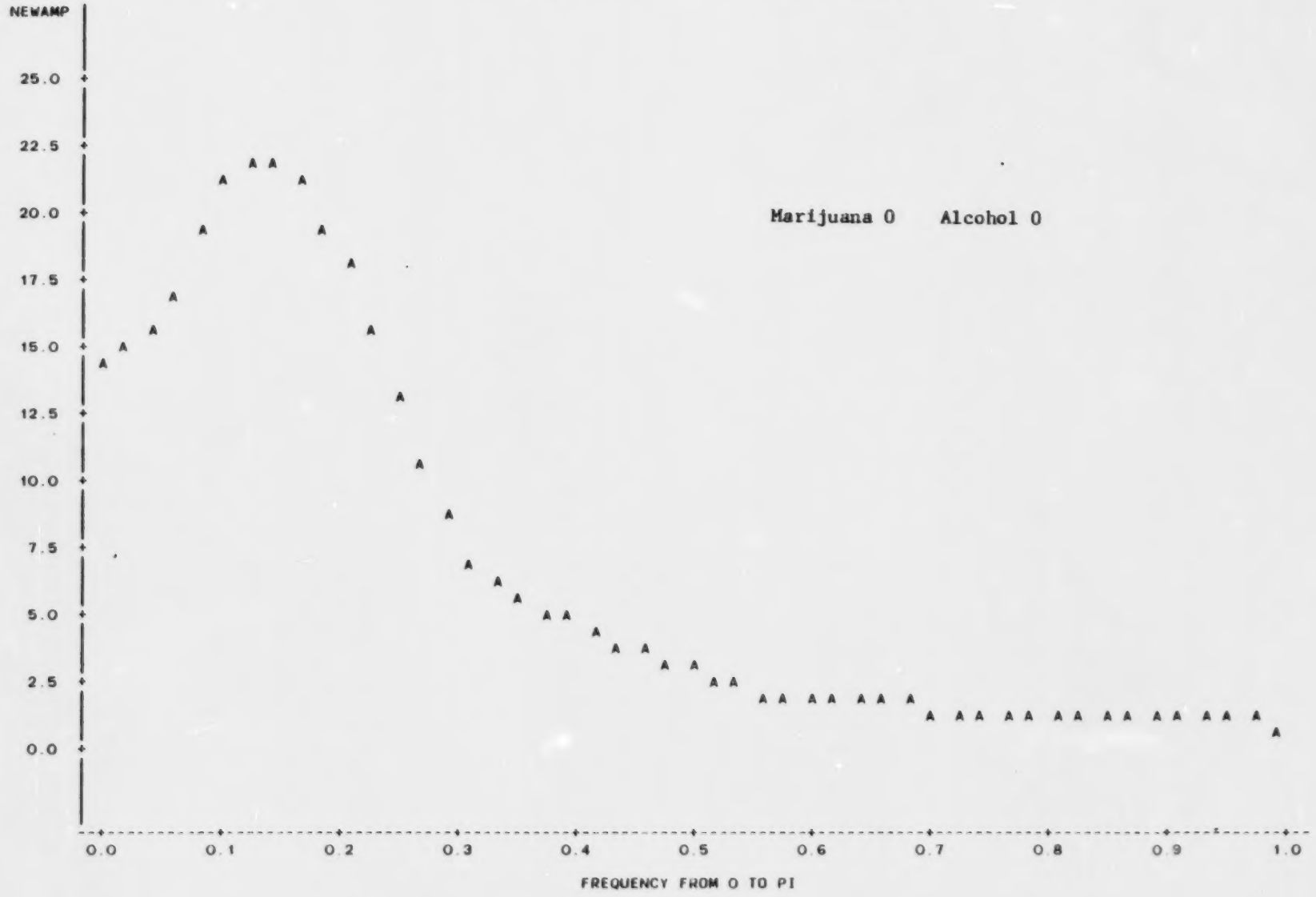
Appendix E-1

Mean Normalized Power Spectrum of Steering Wheel Angle:

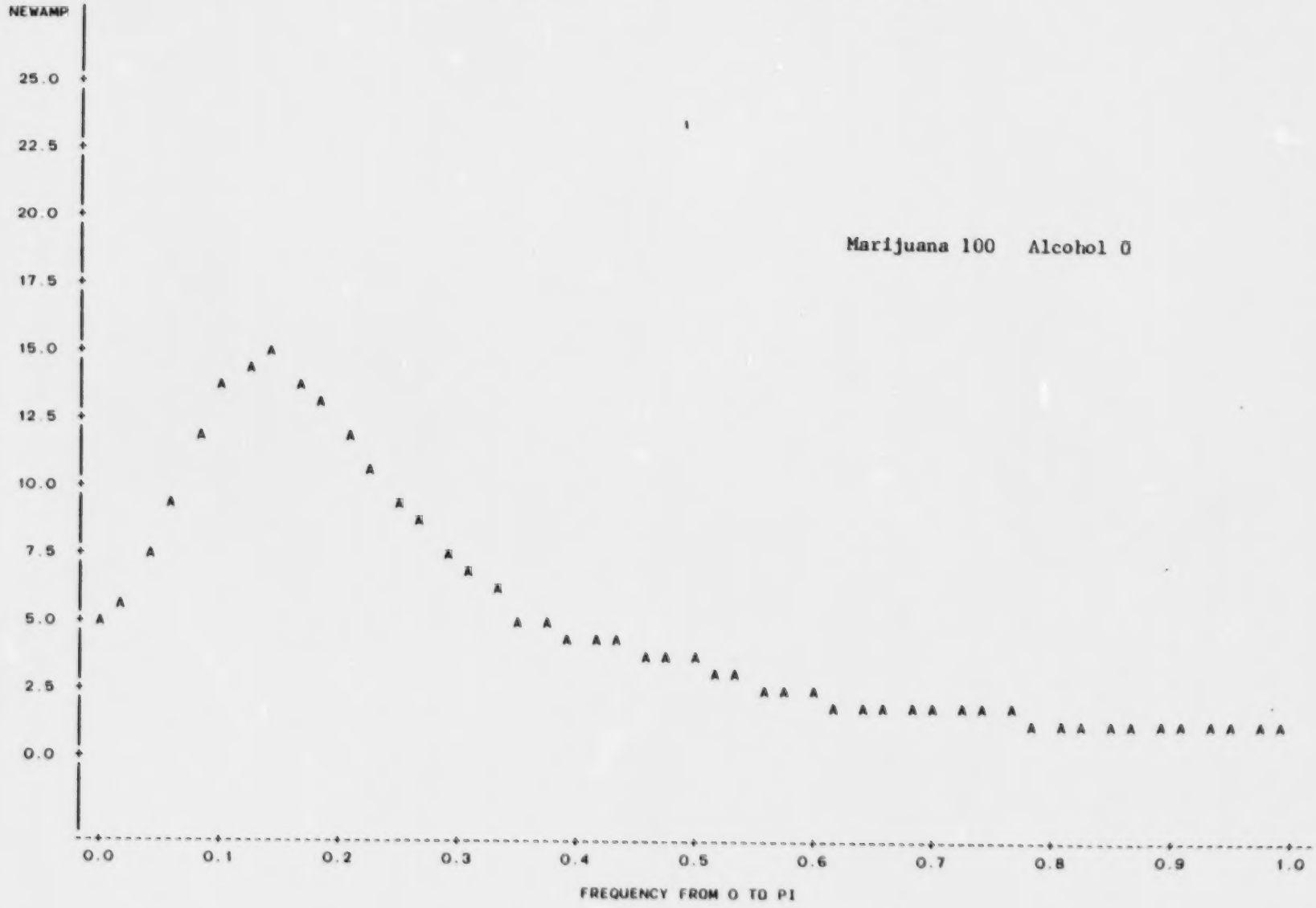
Velocity Maintenance Task

Evening Treatment Runs

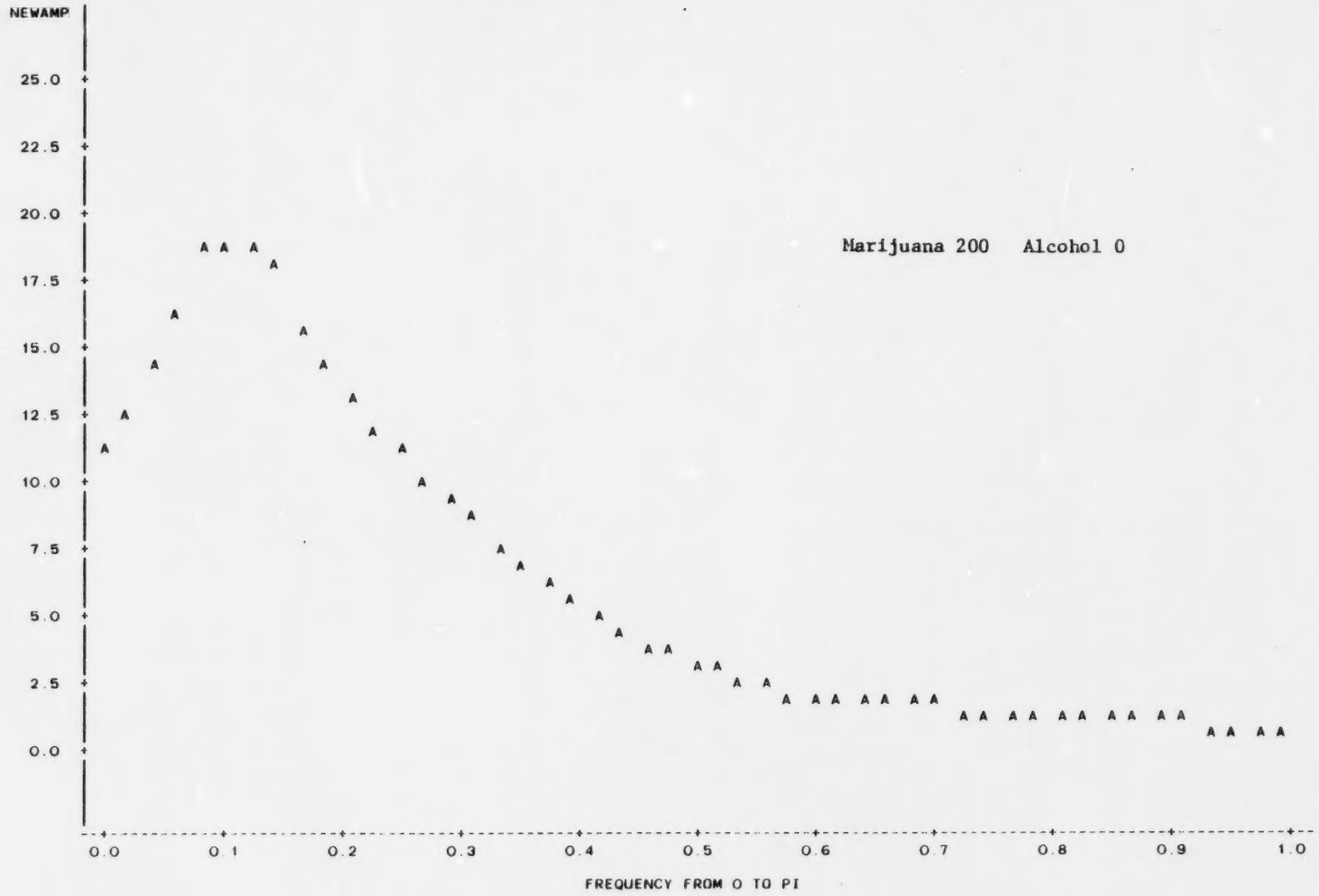
PLOT OF NEWAMP*FREQ LEGEND: A = 1 OBS, B = 2 OBS, ETC.



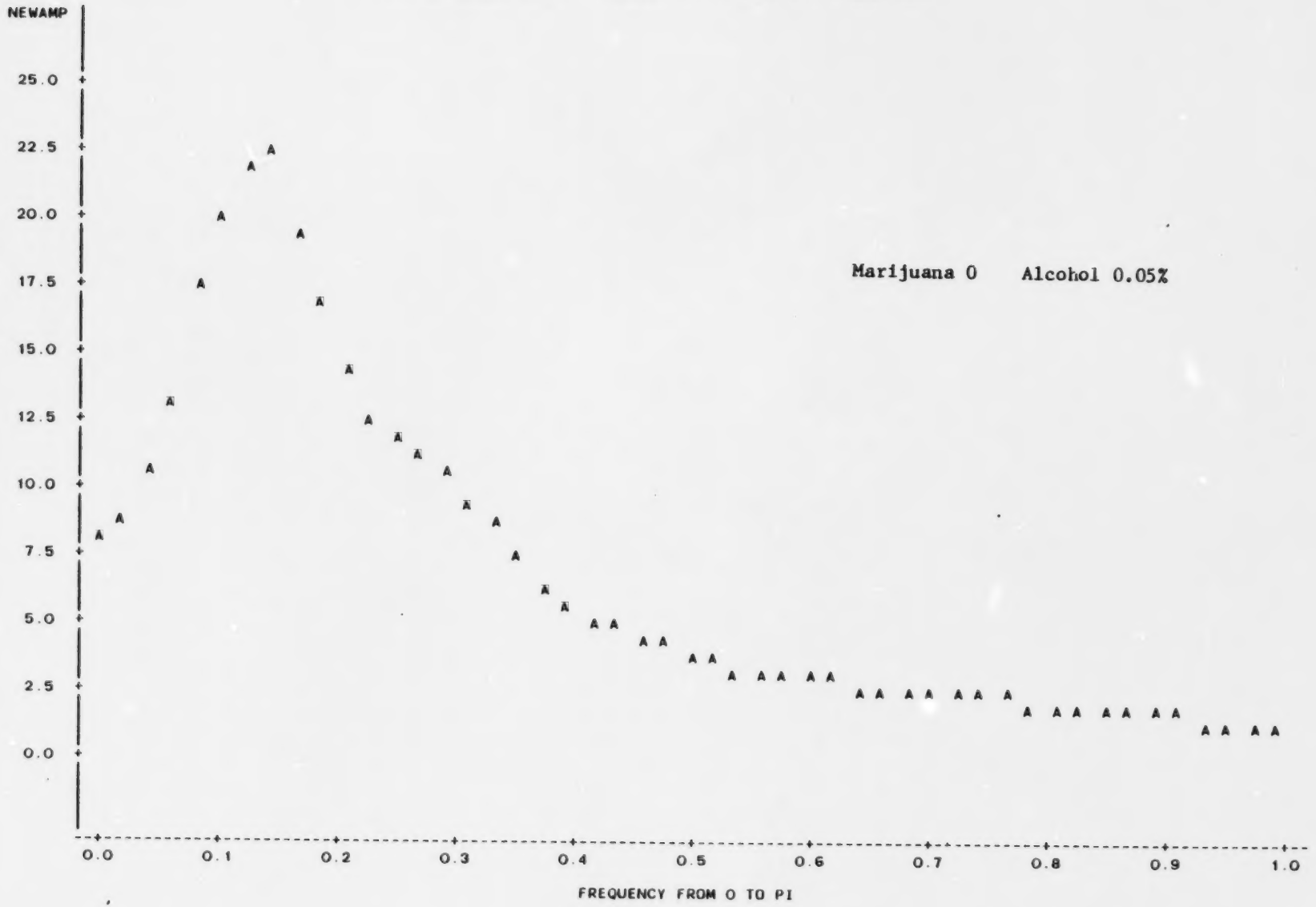
PLOT OF NEWAMP*FREQ LEGEND: A = 1 OBS, B = 2 OBS, ETC.



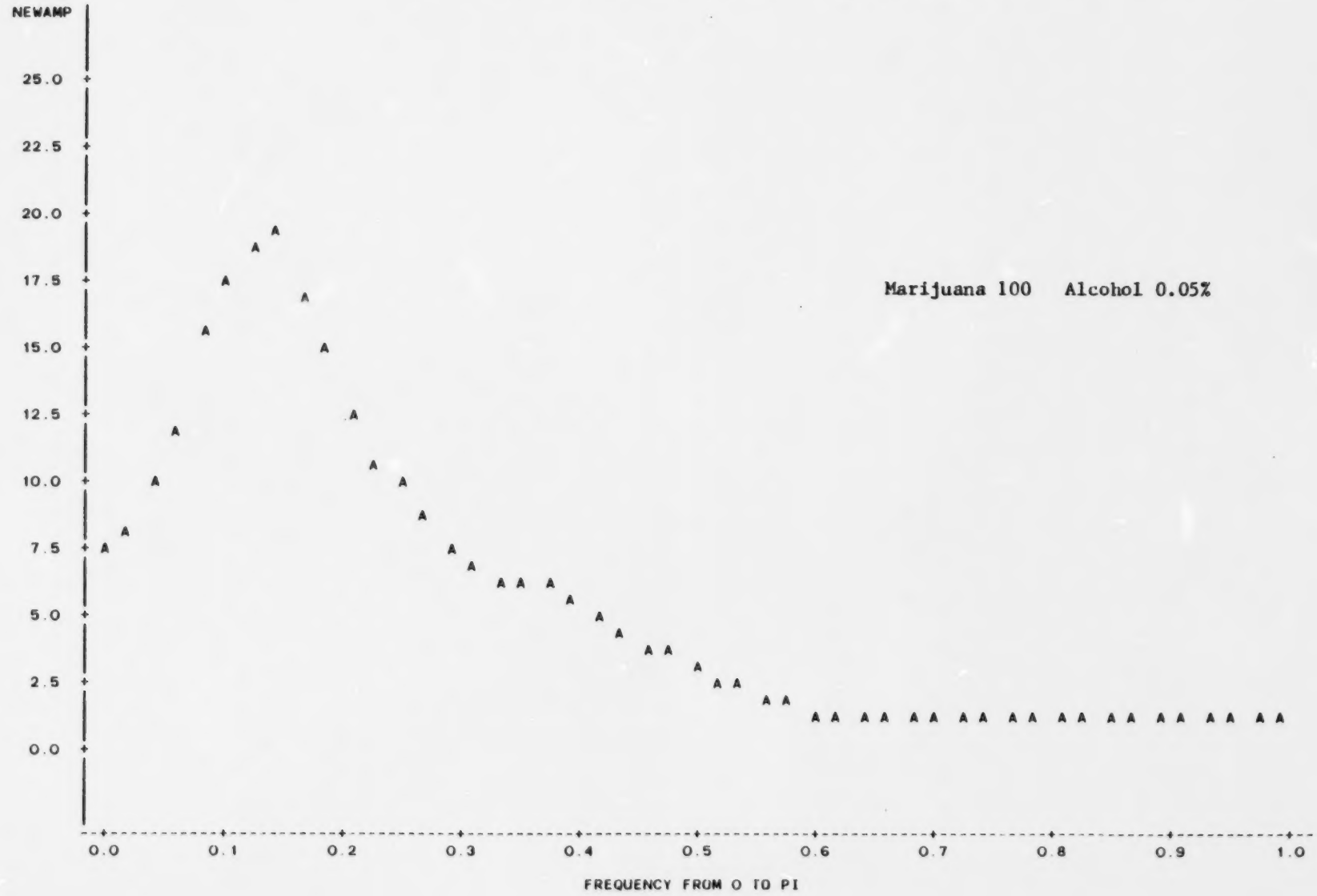
PLOT OF NEWAMP*FREQ LEGEND: A = 1 OBS, B = 2 OBS, ETC.



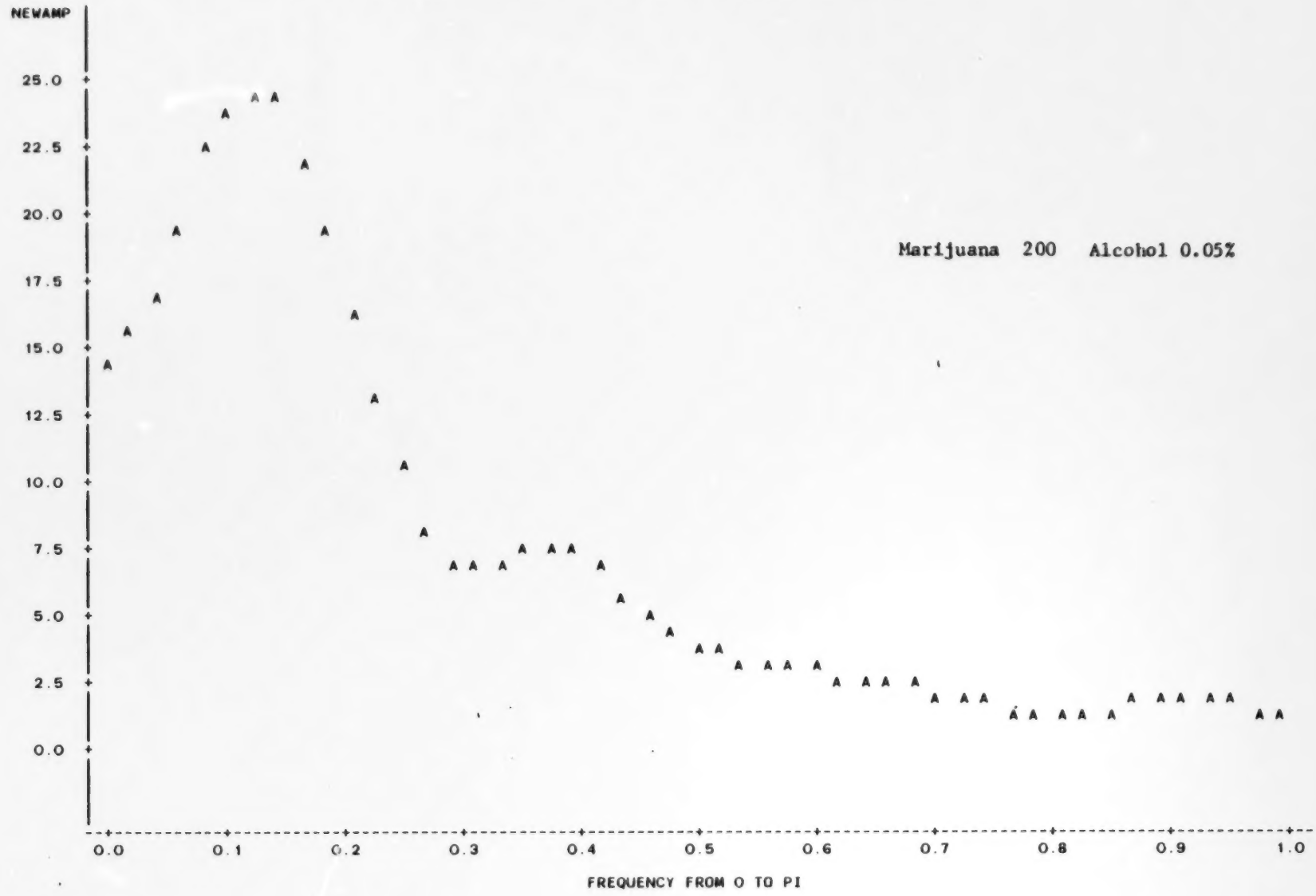
PLOT OF NEWAMP*FREQ LEGEND: A = 1 OBS, B = 2 OBS, ETC.



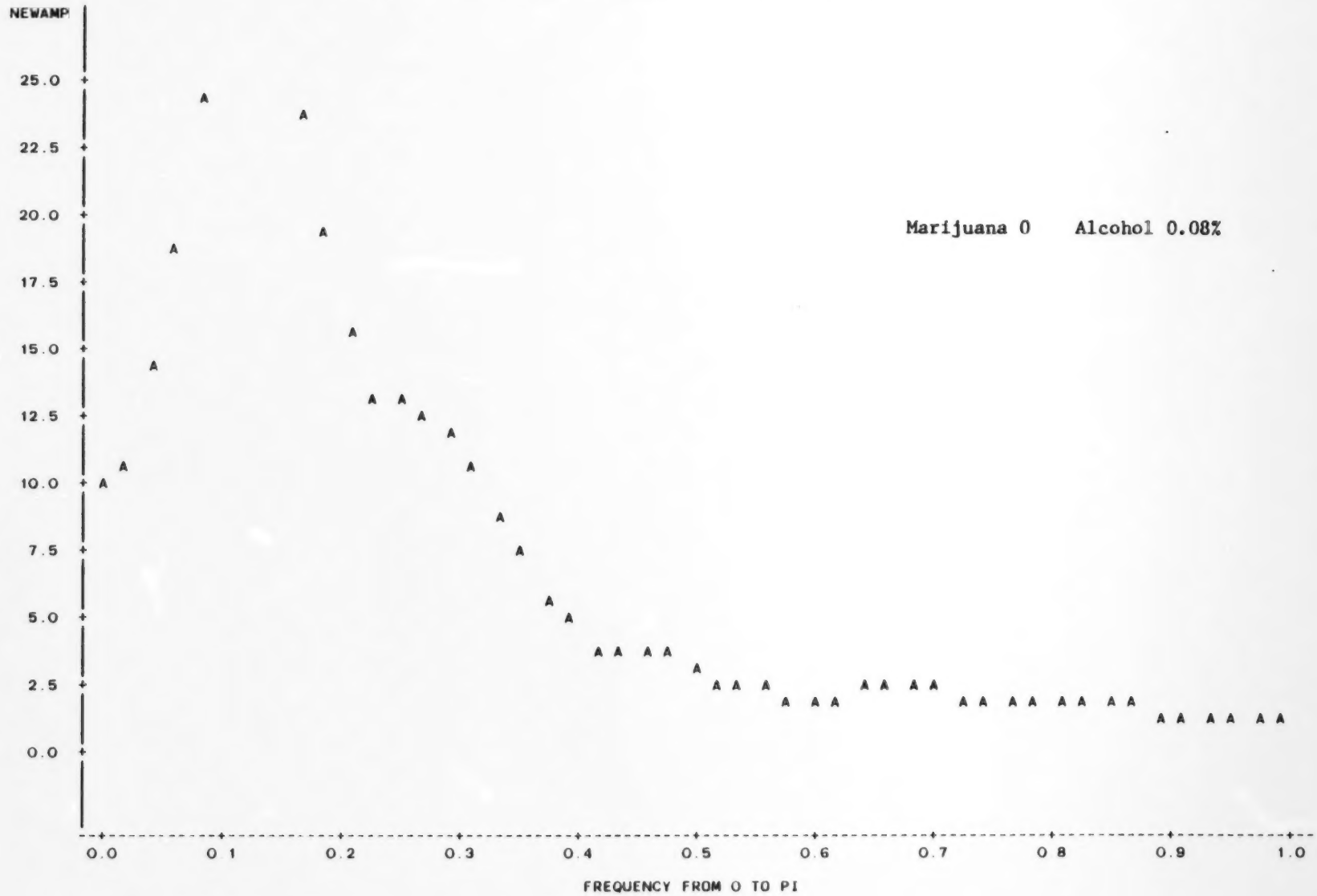
PLOT OF NEWAMP*FREQ LEGEND: A = 1 OBS, B = 2 OBS, ETC.



PLOT OF NEWAMP*FREQ LEGEND: A = 1 OBS, B = 2 OBS, ETC.



PLOT OF NEWAMP*FREQ LEGEND: A = 1 OBS, B = 2 OBS, ETC.



NOTE: 3 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

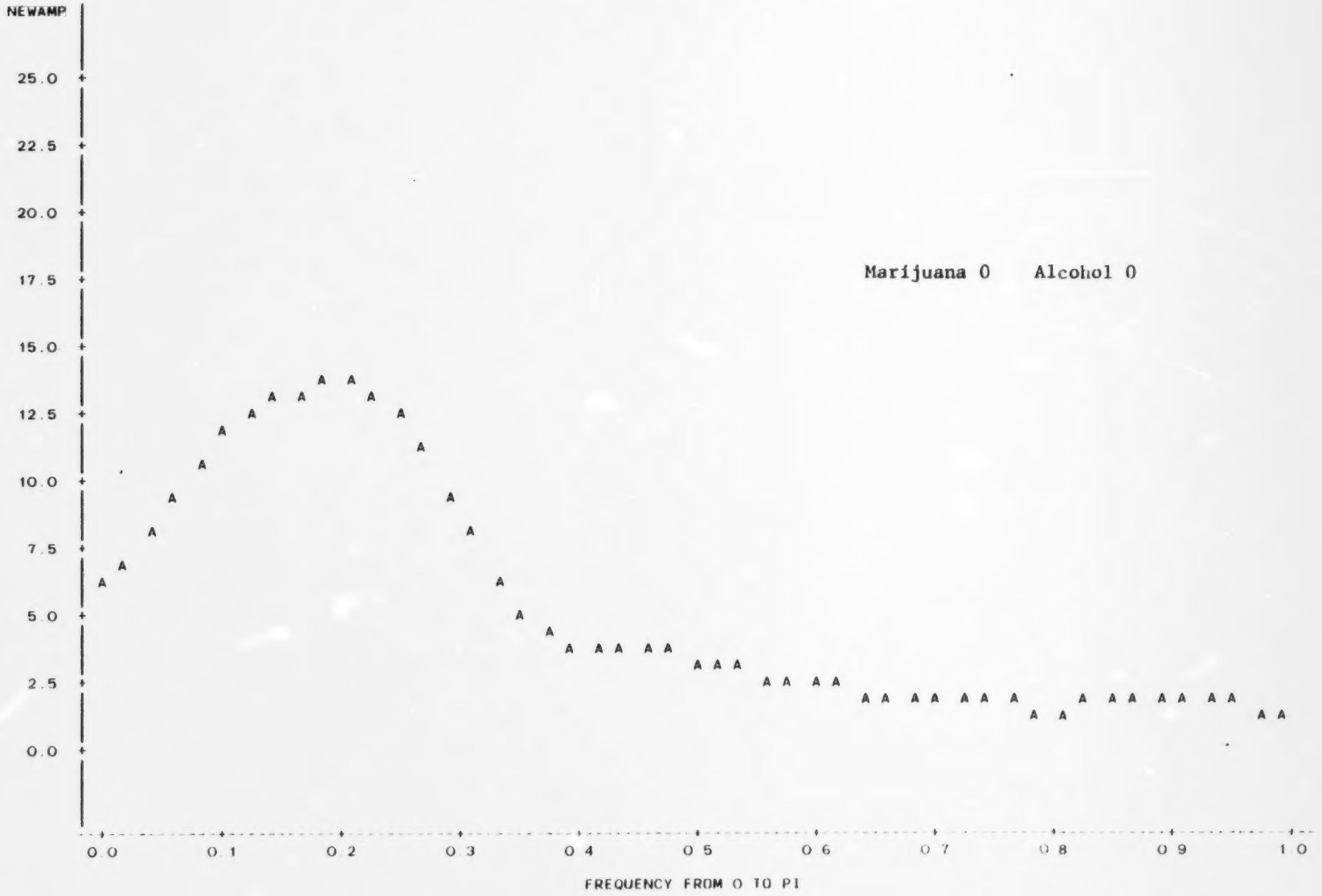
Appendix E-2

Mean Normalized Power Spectrum of Steering Wheel Angle:

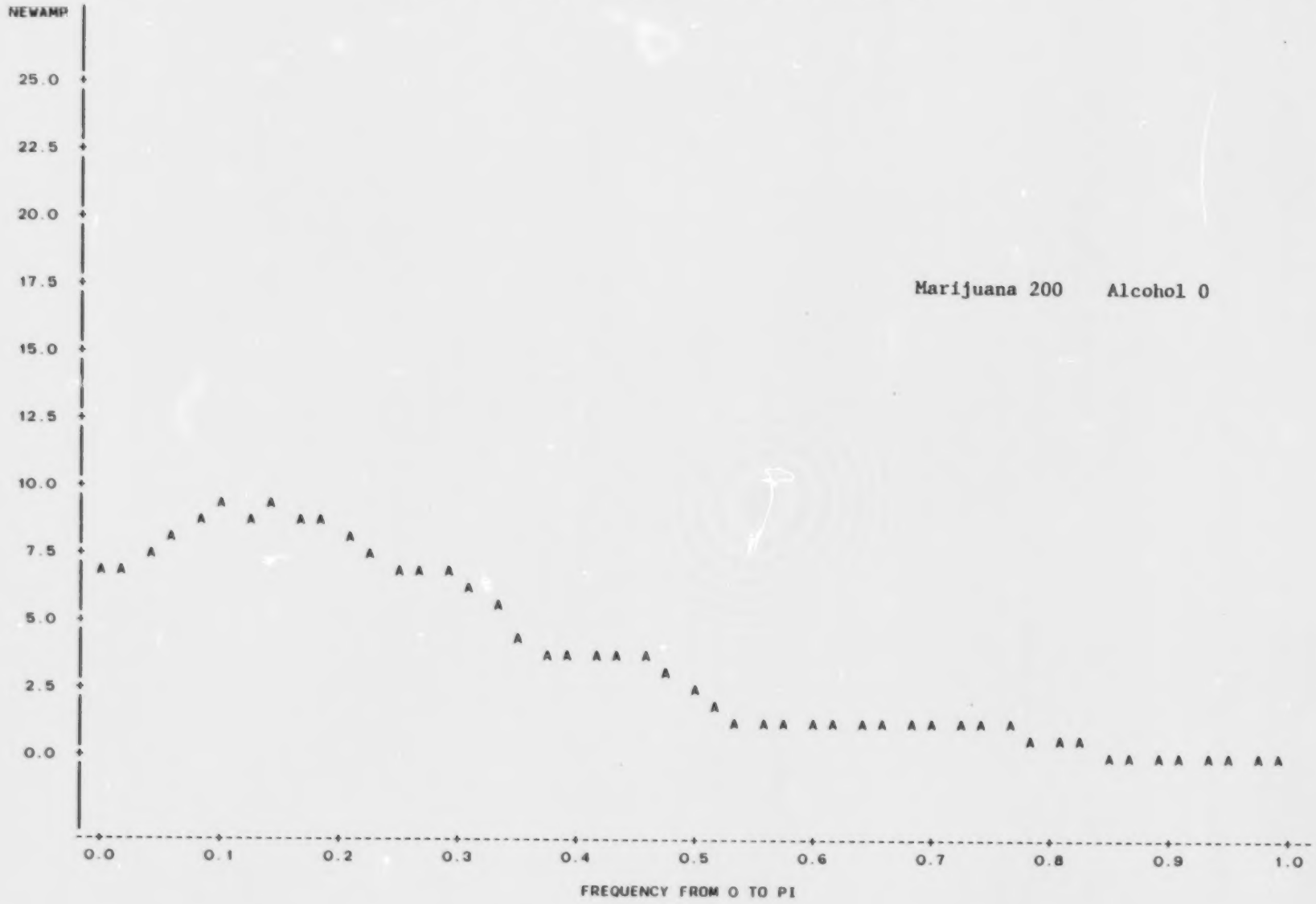
Velocity Maintenance Task

Morning After Treatment Runs

PLOT OF NEWAMP*FREQ LEGEND: A = 1 OBS, B = 2 OBS, ETC.

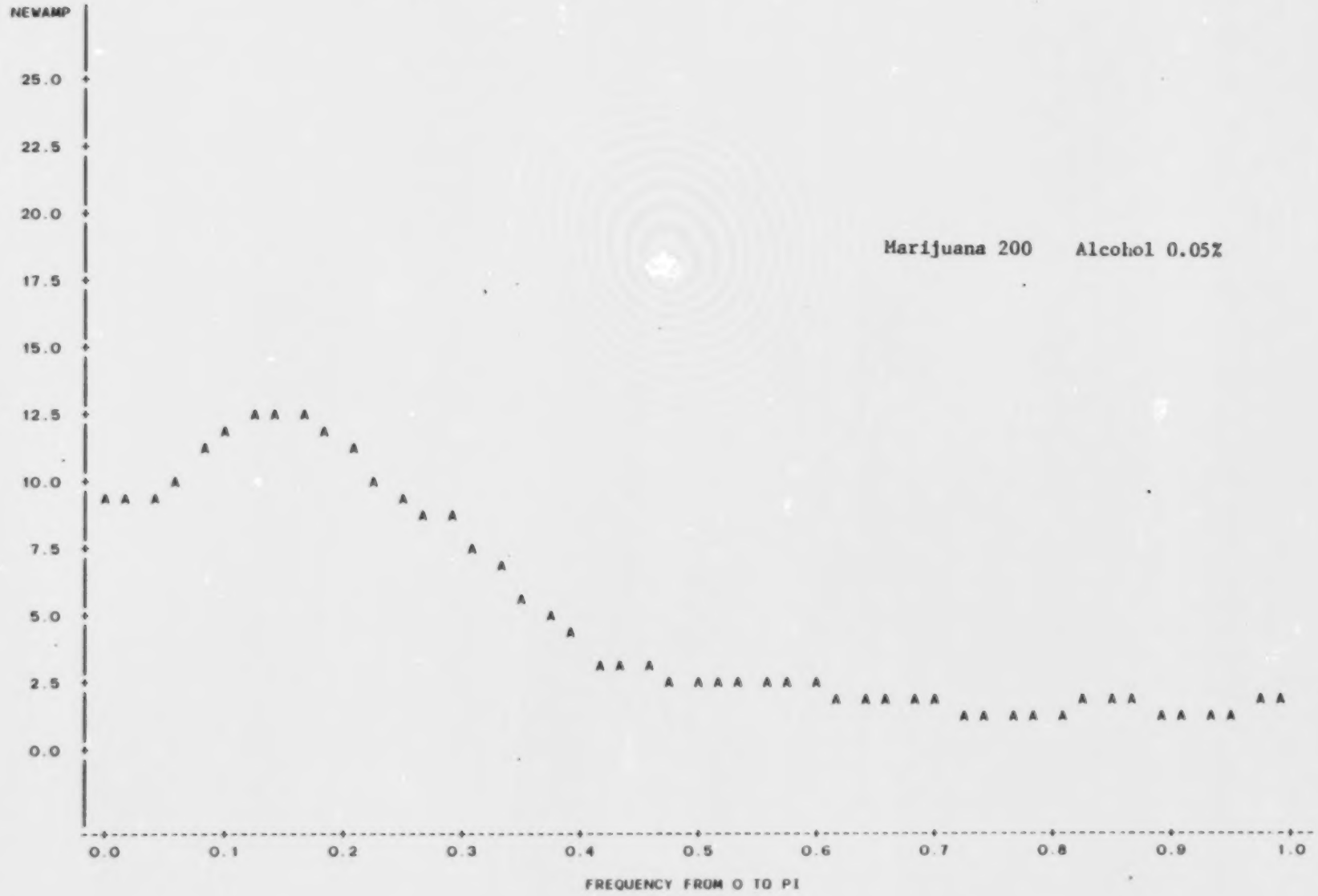


PLOT OF NEWAMP*FREQ LEGEND: A = 1 OBS, B = 2 OBS, ETC.

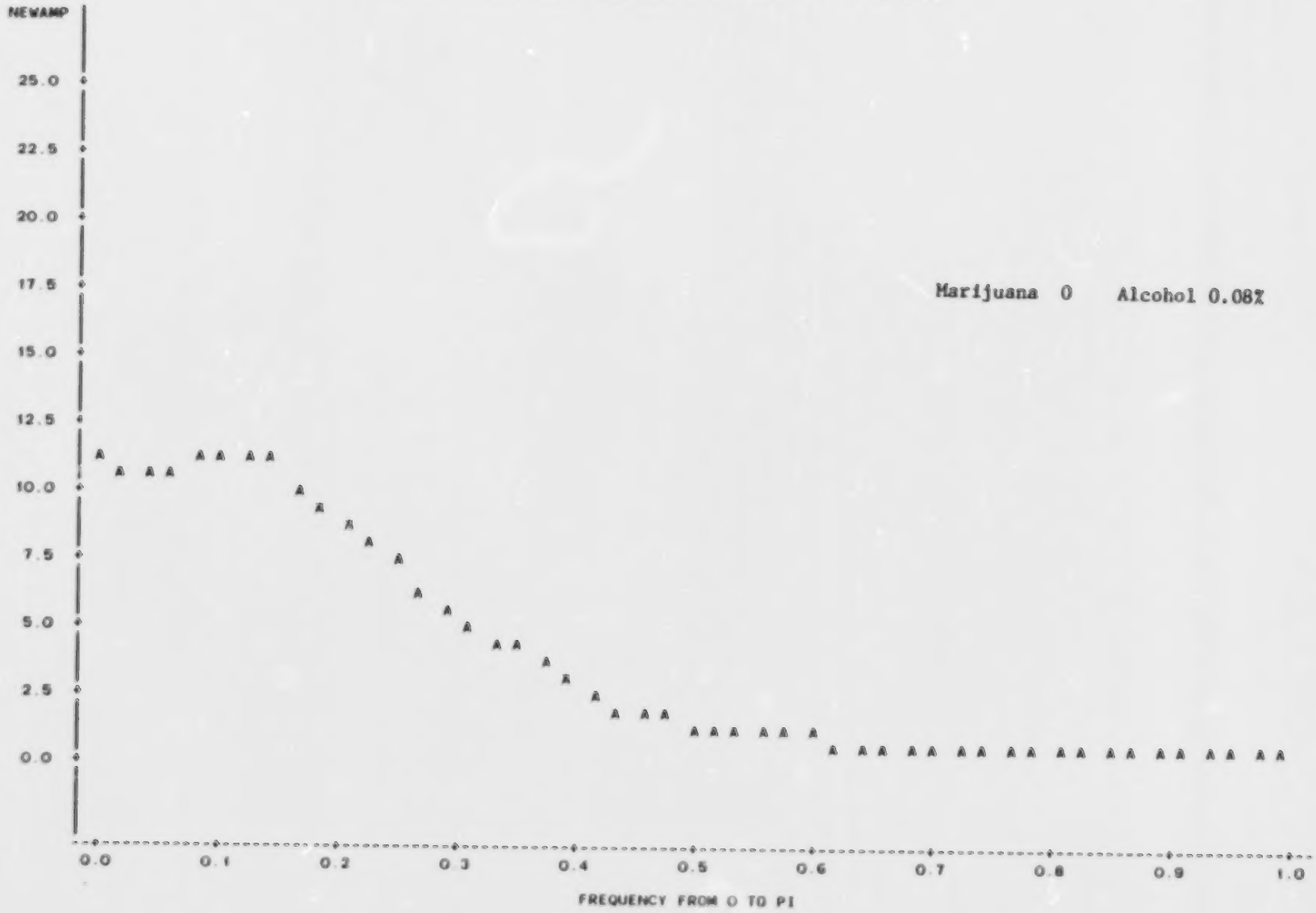


Marijuana 200 Alcohol 0

PLOT OF NEWAMP*FREQ LEGEND: A = 1 OBS, B = 2 OBS, ETC.



PLOT OF NEWAMP*FREQ LEGEND: A = 1 OBS, B = 2 OBS, ETC.



Marijuana 0 Alcohol 0.08%

APPENDIX F

QUESTIONNAIRE RESULTS

Questionnaire II

1) What do you think the cigarettes given to you contains?

1. little or no drug
2. significant amount of drug

Treatments	0,0	0,100	0,200	.05,0	.05,100	.05,200	.08,0
	1.2	1.2	1.2	1.2	1.2	1.2	1.2
n=	7 4	4 8	3 8	3 8	0 9	2 7	8 3
mean=	1.4	1.7	1.7	1.7	2.0	1.8	1.3

2) What do you think the drink given to you contained?

1. little or no alcohol
2. signficant amount of alcohol

Treatments	0,0	0,100	0,200	.05,0	.05,100	.05,200	.08,0
	1.2	1.2	1.2	1.2	1.2	1.2	1.2
n=	10 1	9 3	6 5	1 10	3 7	2 7	3 8
mean=	1.1	1.3	1.5	1.9	1.7	1.8	1.7

3) How affected were you by the combination of drink and cigarettes?

1. very strongly
2. strongly
3. moderately
4. mildly
5. not at all

Treatments	0,0	0,100	0,200	.05,0
	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5
n=	0 0 3 8 0	0 4 5 2 1	0 5 3 3 0	0 2 7 2 0
mean=	3.7	3.0	2.8	3.0

Treatments	.05,100	.05,200	.08,0
	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5
n=	0 6 2 2 0	1 4 1 3 0	0 1 5 5 0
mean=	2.6	2.7	3.4

Questionnaire II con't

4) Overall, are the drinks and cigarettes making you feel better or worse than you normally feel?

1. feel much better
2. feel somewhat better
3. no change
4. feel somewhat worse
5. feel much worse

Treatment	0,0	0,100	0,200	.05,0
	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5
n=	2 6 3 0 0	1 6 2 2 0	2 5 3 1 0	2 6 1 1 1
mean=	2.1	2.5	2.3	2.4

Treatment	.05,100	.05,200	.08,0
	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5
n=	1 4 4 0 0	3 3 3 0 0	0 9 1 1 0
mean=	2.3	2.0	2.3

5) Did you experience any of the following:

1. trembling
2. upset stomach
3. shortness of breath
4. tingling sensations
5. headaches
6. nausea
7. nausea
8. restlessness
9. anxiety

Treatment	0,0	0,100	0,200
	1.2.3.4.5.6.7.8.9	1.2.3.4.5.6.7.8.9	1.2.3.4.5.6.7.8.9
n=	0 0 1 3 0 1 0 1 0	1 0 1 3 0 1 0 2 0	2 0 1 2 0 4 0 2 0

Treatment	.05,0	.05,100
	1.2.3.4.5.6.7.8.9	1.2.3.4.5.6.7.8.9
n=	0 0 1 1 1 0 0 2 1	0 0 1 3 0 2 0 3 0

Treatment	.05,200	.08,0
	1.2.3.4.5.6.7.8.9	1.2.3.4.5.6.7.8.9
n=	1 0 0 0 0 3 0 1 0	0 0 0 1 0 0 0 2 0

Questionnaire II con't

6) Is your ability to concentrate affected?

1. can concentrate much better
2. can concentrate somewhat better
3. no change
4. somewhat worse concentration
5. much worse concentration

Treatment	0,0	0,100	0,200	.05,0
	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5
n=	0 0 7 4 0	1 1 4 6 0	0 1 4 6 0	0 2 3 5 1
mean=	3.4	3.3	3.5	3.5

Treatment	.05,100	.05,200	.08,0
	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5
n=	2 3 0 4 1	0 1 3 5 0	0 1 4 6 0
mean=	2.9	3.1	3.5

7) Rate the dose you smoked this evening.

1. wasn't effected
2. much less stoned than I usually get
3. less stoned than I usually get
4. as stoned as I usually get
5. more stoned than I usually get
6. much more stoned than I usually get

Treatment	0,0	0,100	0,200	.05,0
	1.2.3.4.5.6	1.2.3.4.5.6	1.2.3.4.5.6	1.2.3.4.5.6
n=	2 2 7 0 0 0	1 1 4 6 0 0	0 0 3 4 4 0	0 1 4 4 2 0
mean=	2.5	3.3	4.1	3.6

Treatment	.05,100	.05,200	.08,0
	1.2.3.4.5.6	1.2.3.4.5.6	1.2.3.4.5.6
n=	0 0 1 4 4 0	0 0 1 6 2 1	1 3 6 0 1 0
mean=	4.3	4.3	2.7

Questionnaire II con't

8) Whan you smoke how frequently do you get as high as you were this evening?

1. everytime
2. most of the time
3. less than half the time
4. occasionally
5. never
6. didn't get high

Treatment	0,0	0,100	0,200	.05,0
	1.2.3.4.5.6	1.2.3.4.5.6	1.2.3.4.5.6	1.2.3.4.5.6
n=	2 3 3 2 0 1	2 9 0 1 0 0	0 5 2 4 0 0	2 5 2 1 0 1
mean=	2.8	2.0	2.9	2.5

Treatment	.05,100	.05,200	.08,0
	1.2.3.4.5.6	1.2.3.4.5.6	1.2.3.4.5.6
n=	1 4 3 1 0 0	1 5 1 3 0 0	4 2 1 2 0 2
mean=	2.4	2.6	2.8

9) Would younormally consume themarijuana you had this evening?

1. over a longer time period than this evening
2. in the same time period as this evening
3. over an hour period
4. over a half hour period
5. all at once

Treatment	0,0	0,100	0,200	.05,0
	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5
n=	2 2 3 0 3	4 3 3 2 0	6 2 0 1 1	4 3 2 1 1
mean=	3.0	2.3	1.9	2.3

Treatment	.05,100	.05,200	.08,0
	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5
n=	4 3 1 1 1	6 1 1 1 0	1 1 1 0 8
mean=	2.2	1.7	4.2

Questionnaire II con't

10) How do you feel about driving now?

1. very confident
2. confident
3. somewhat less confident than usual
4. much less confident than usual
5. I normally wouldn't drive

Treatment	0,0	0,100	0,200	.05,0
	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5
n=	1 7 2 0 0	1 8 2 0 1	0 4 5 1 1	1 5 2 2 1
mean=	2.2	2.3	2.9	2.7

s2

Treatment	.05,100	.05,200	.08,0
	1.2.3.4.5	1.2.3.4.5	1.2.3.4.5
n=	0 4 3 0 3	0 4 3 1 1	3 2 6 0 0
mean=	3.2	2.9	2.3

11) In the past year, how often have you driven when you were as high as you were this evening?

1. several times a week
2. several times a month
3. 5 - 6 times a year
4. 1 - 2 times a year
5. never
6. I'm not high

Treatment	0,0	0,100	0,200	.05,0
	1.2.3.4.5.6	1.2.3.4.5.6	1.2.3.4.5.6	1.2.3.4.5.6
n=	1 2 3 3 1 1	0 4 4 0 3 1	1 1 5 3 1 0	0 2 3 5 1 0
mean=	3.4	3.4	3.2	3.5

Treatment	.05,100	.05,200	.08,0
	1.2.3.4.5.6	1.2.3.4.5.6	1.2.3.4.5.6
n=	1 1 2 2 4 0	0 3 4 1 1 0	2 6 2 1 0 0
mean=	3.7	3.0	2.2

Questonnaire II con't

S - too short
ok - okay
L - too long

12) Please comment on the schedule used to smoke the marijuana.

- was the time for inhaling too short, okay, too long?
- was the time for holding too short, okay, too long?
- was the rest pause too short, okay, too long?

Inhale	0,0			0,100			0,200			.05,0			.05,100			.05,200			.08,0		
	1			2			3			4			5			6			7		
	S	ok	L	S	ok	L	S	ok	L	S	ok	L	S	ok	L	S	ok	L	S	ok	L
n=	6	5	0	7	5	0	1	9	1	5	4	2	5	5	0	3	7	0	4	6	1

Hold	1			2			3			4			5			6			7		
	S	ok	L	S	ok	L	S	ok	L	S	ok	L	S	ok	L	S	ok	L	S	ok	L
n=	4	7	0	1	10	1	3	5	3	3	7	1	2	7	1	2	8	0	6	5	0

Rest	1			2			3			4			5			6			7		
	S	ok	L	S	ok	L	S	ok	L	S	ok	L	S	ok	L	S	ok	L	S	ok	L
n=	2	6	3	2	7	3	3	8	0	3	6	2	1	6	3	2	7	1	1	8	2

POOR
QUALITY
ORIGINAL